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THE ROBERTSHAW LINE-UP FOR 1936

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The ranges equipped with Robertshaw oven-heat-control will be the ranges that win contest-sales for you and your representatives. *Again*, and even more forcefully, the Robertshaw dial will be featured in advertising, nationally—and in stores, nationally. *Again* Robertshaw steps ahead—with a plan of promotion which gives you material to help turn contest efforts into Robertshaw-equipped-range profits.

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ROBERTSHAW THERMOSTAT COMPANY

YOUNGWOOD, PENNA.

February 1936 ♦ ♦ 25 Cents

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LARGE CAPACITY PRESSED STEEL METERS

A midwest gas company installed two batteries of EMCO No. 5 Pressed Steel Large Capacity Meters in different departments of a steel plant in 1928. One service—an all on or all off load several times per hour—was a severe usage, but after each meter had measured about 200,000,000 cu. ft. of gas, the repair cost was only approximately 13 cents per million cu. ft.

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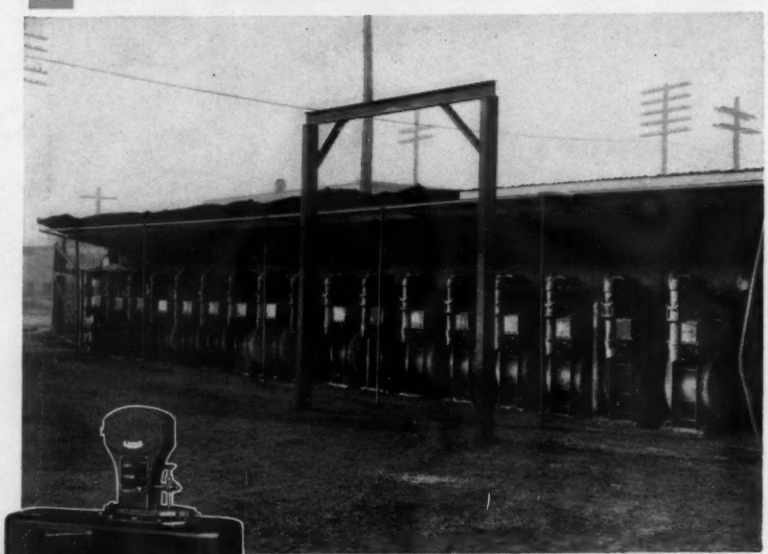
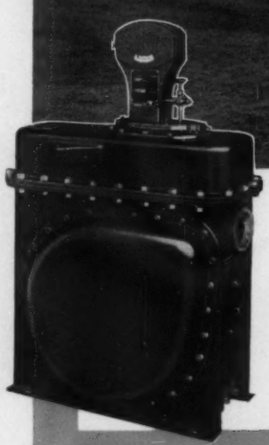
EMCO'S correct engineering and design principles, quality raw materials, modern manufacturing facilities and equipment, and skilled workmanship make possible this reliability and low maintenance cost with accuracy in measurement.



Battery of EMCO Pressed Steel Meters Measuring Gas Used By a Midwestern Steel Company



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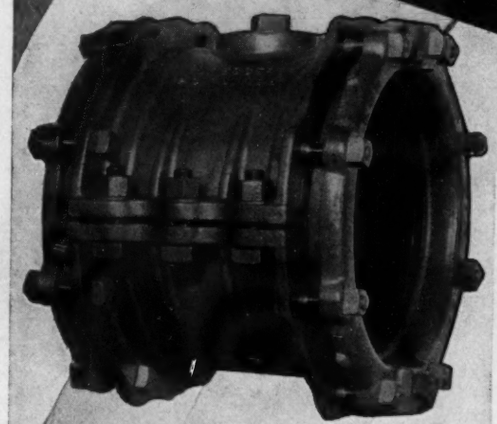

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FIX IT *Luck*— with a Dresser Sleeve!

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(1) Makes possible repairs in a wet ditch or in sub-zero weather, without interruption of the service, if desired.

(2) Gives you a *rubber-packed* joint that an ordinary workman can install with a wrench—*in a few minutes!*

(3) Cuts your costs of labor and materials.

(4) Effects an instant yet lasting seal that you *leave on permanently.*

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Use Style 57 Cast Split Sleeve for packing off a section of pipe 8" long. Multiple installations can be used to enclose almost any length of break in cast-iron pipe. Sleeve sizes: 2" to 12" inclusive.

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KEEP A DRESSER SLEEVE ON HAND FOR QUICK REPAIRS

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WESTERN GAS

"Reg. U. S. Pat. Off."

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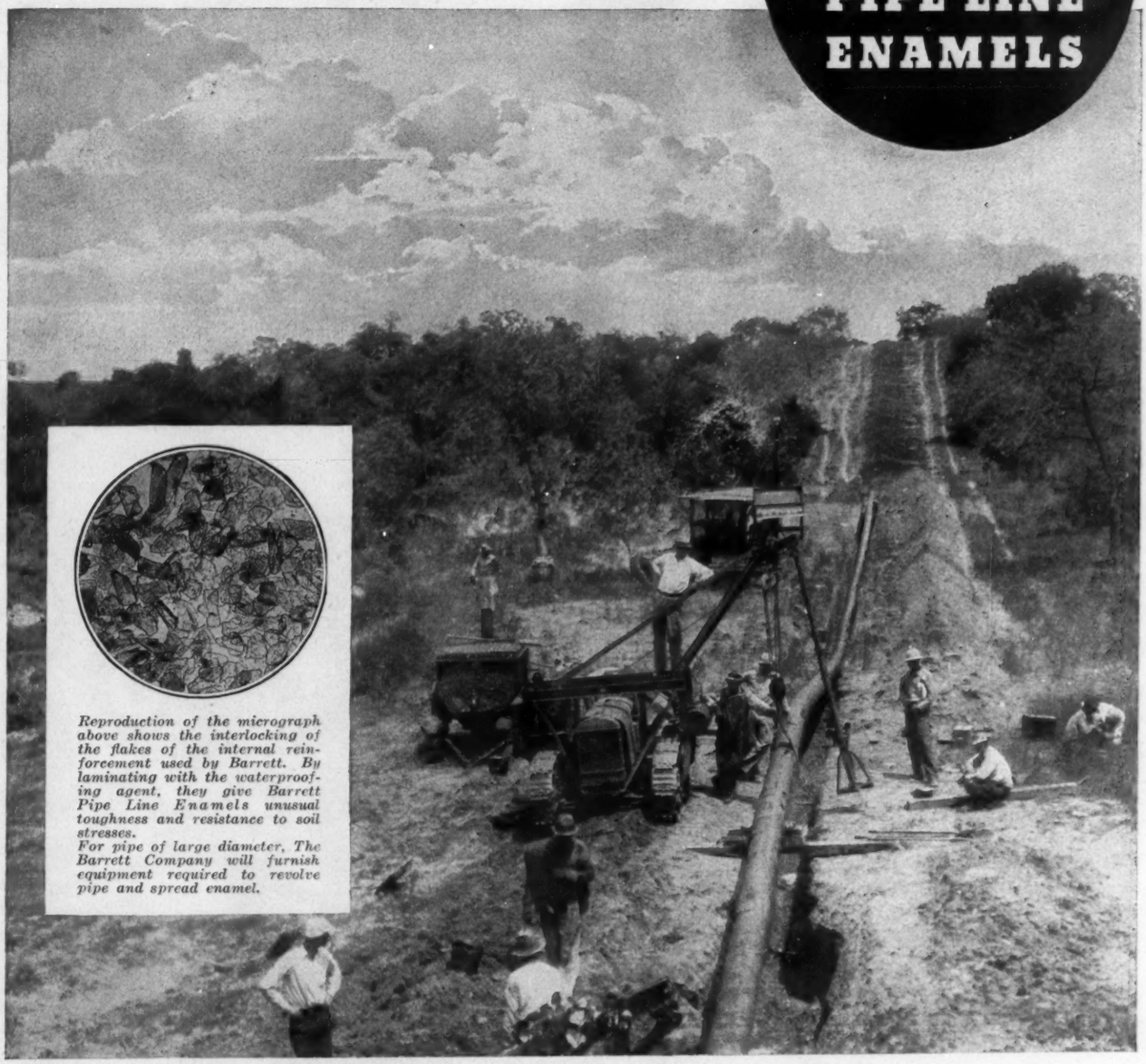
Adding Years of Useful Life to Underground Pipe Lines

Barrett PIPE LINE ENAMELS



Reproduction of the micrograph above shows the interlocking of the flakes of the internal reinforcement used by Barrett. By laminating with the waterproofing agent, they give Barrett Pipe Line Enamels unusual toughness and resistance to soil stresses.
For pipe of large diameter, The Barrett Company will furnish equipment required to revolve pipe and spread enamel.

Courtesy Lone Star Gas Co.

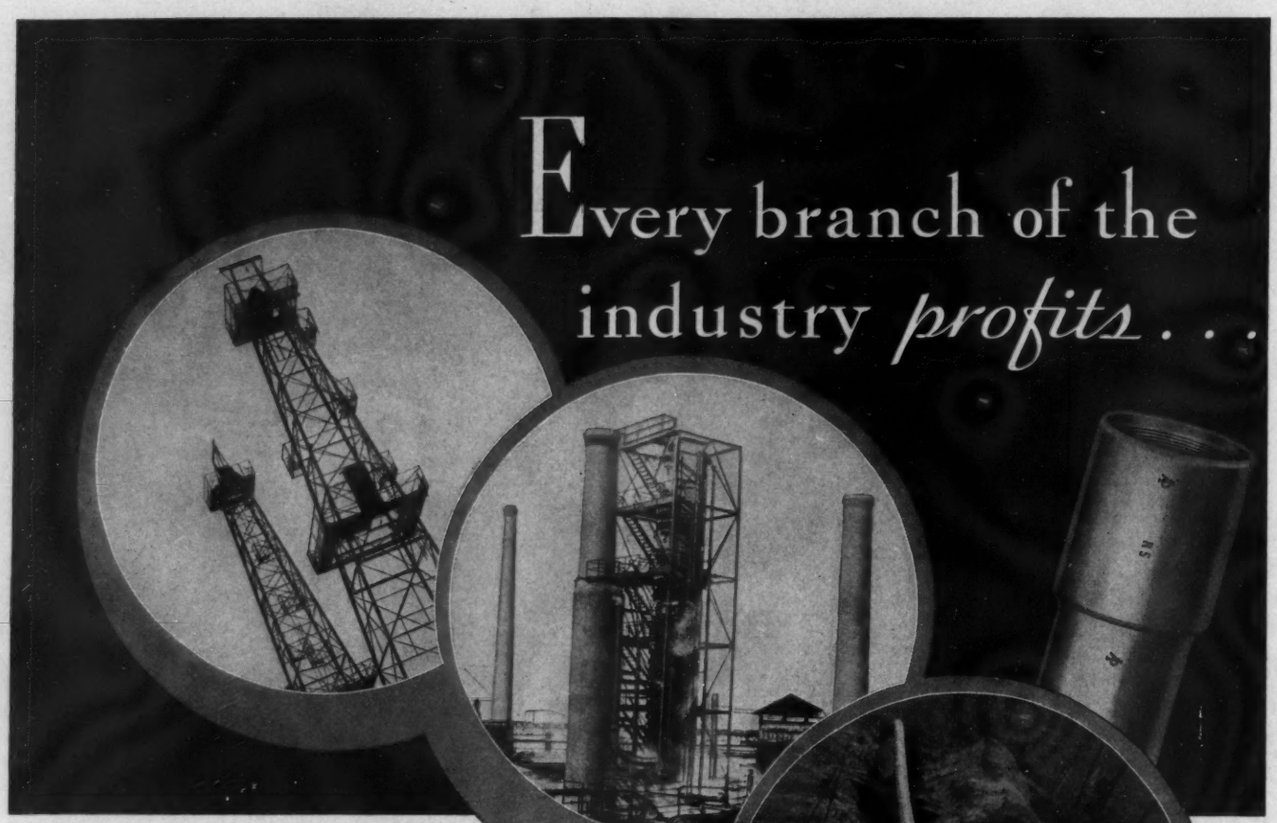
FIELD SERVICE

Carefully trained Barrett field men will gladly work with you, combining their special knowledge and experience with your familiarity with conditions along the right-of-way.

THE TECHNICAL SERVICE BUREAU of The Barrett Company invites your consultation with its technically trained staff, without cost or obligation. Address The Technical Service Bureau, The Barrett Company, 40 Rector Street, New York.

Experience has demonstrated the effectiveness of Barrett Pipe Line Enamels in protecting pipe against corrosion and electrolysis. These enamels are a result of Barrett's 82 years of successful manufacturing experience. They are a combination of straight run coal-tar pitch—the most suitable bituminous material for underground work—and a non-porous, non-absorbent, dielectric, flake-type filler that greatly increases normal strength and resistance to soil stresses. Properly applied, Barrett Pipe Line Enamels will add years to the life of underground pipe.

THE BARRETT COMPANY, 40 Rector Street, New York, N. Y.



Every branch of the industry *profits* . . .

THROUGH THE USE OF . . . .

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HIGH YIELD POINT — ELECTRIC WELD — HIGH DUCTILITY
CASING • TUBING • LINE PIPE

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Write Department W-G for full information.

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HERE'S *Economy for you!*

Cheap Way to Boost GAS!

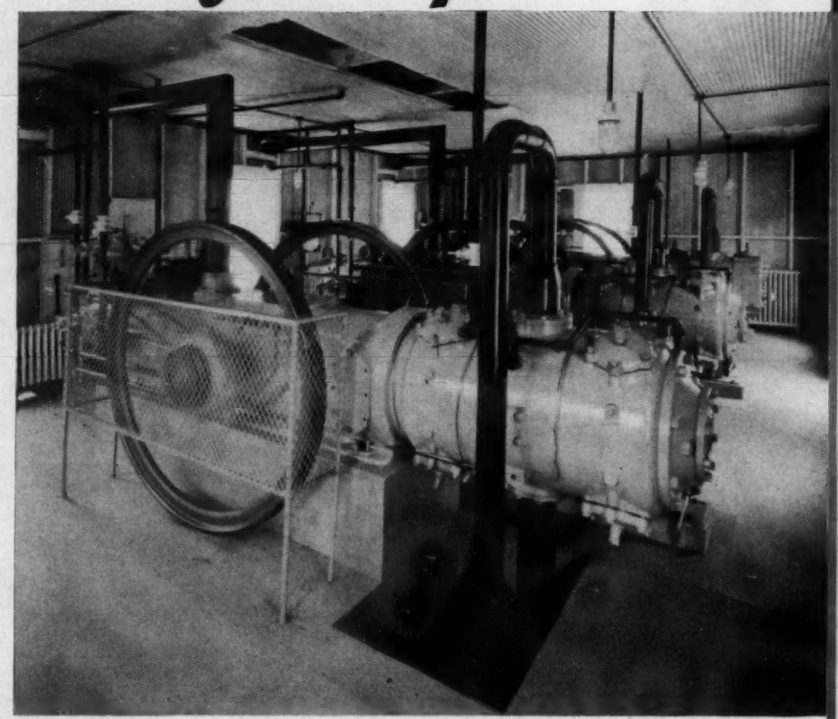

Illustration shows three Cooper-Bessemer Type G-MG compressor units in Godfrey L. Cabot, Inc. compressor station at Ellenboro, W. Va. Each rated 50 H. P. at 300 r. p. m.

THESE Cooper-Bessemer two-cycle Type G-MG compressor units are being used to pick up small quantities of gas from low pressure wells in the immediate vicinity and put it into a main gas pipe line that is carrying fairly high pressure.

There is no simpler nor more economical compressor unit than these to operate — and they may even be equipped for automatic operation.

A Type G-MG 50-H. P. unit or a Type G-MO 70-H. P. unit will pay for itself quickly by handling small quantities of gas from individual wells or from small groups of low-producing wells. Write for Bulletin entitled "Types G-MG, G-MO."

These compact direct-driven compressors are built with Die-forged crankshafts, drop-forged connecting rods and other sturdy parts to insure low maintenance costs.

THE COOPER-BESSEMER CORPORATION

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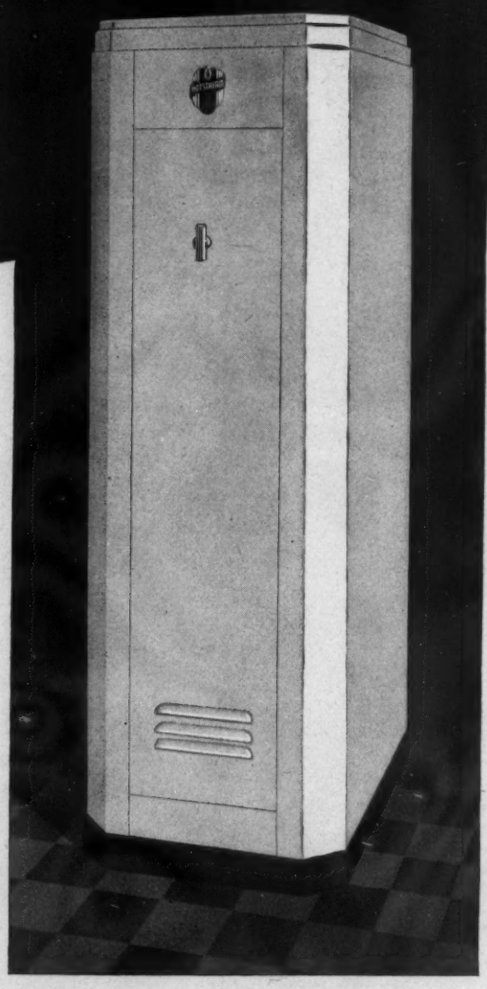
HOTSTREAM

PRESENTS . . .

A Complete New Line for the 1936 Sales Campaign



For the past two years, Hotstream has made an intensive survey in the Utility field to ascertain what types and styles of Automatic Storage Water Heaters would best serve you from a standpoint of successful merchandising and load building.

Development and research work by capable engineers, together with over 20 years of manufacturing experience, enables us to present you with a line of new models, embodying all the essential factors necessary to build your revenue and a corresponding public Good Will.

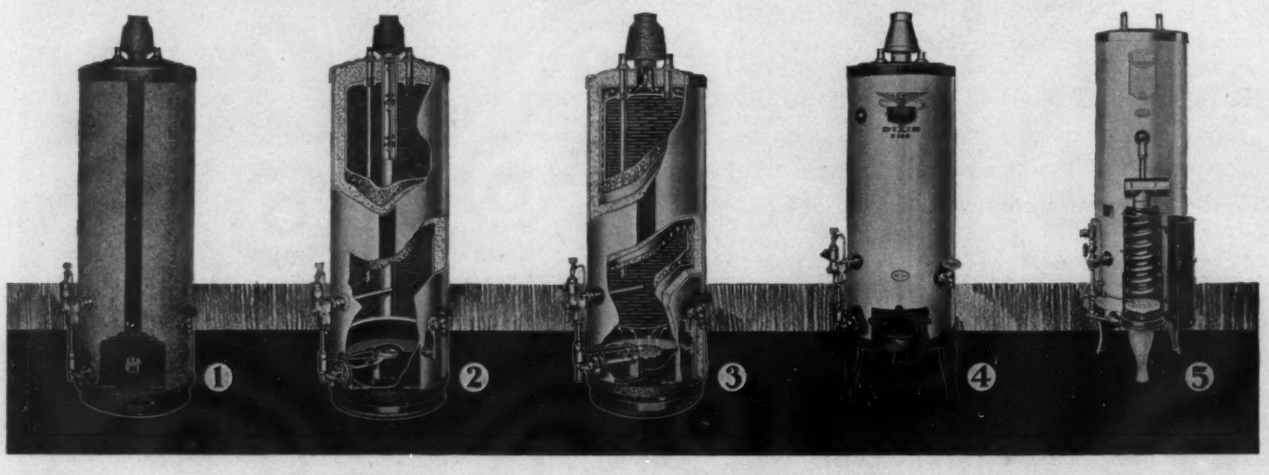
These heaters have been built exclusively for the Utilities. We invite you to avail yourself of the distinct advantage offered by Hotstream's new lines. These heaters will be large factors in the new program for the sale of 300,000 Automatic Heaters in 1936.

HOTSTREAM CABINET—Model "C"

1. **NEW STYLE "RS" and "O" Models**
2. **UTILITY SPECIAL—Model "RS"**
3. **HOTSTREAM FEATURE—Model "O"**
4. **THE DIXIE—Model "R"**
5. **HOTSTREAM—Model "SA"**

THE HOTSTREAM HEATER COMPANY

Cleveland, Ohio



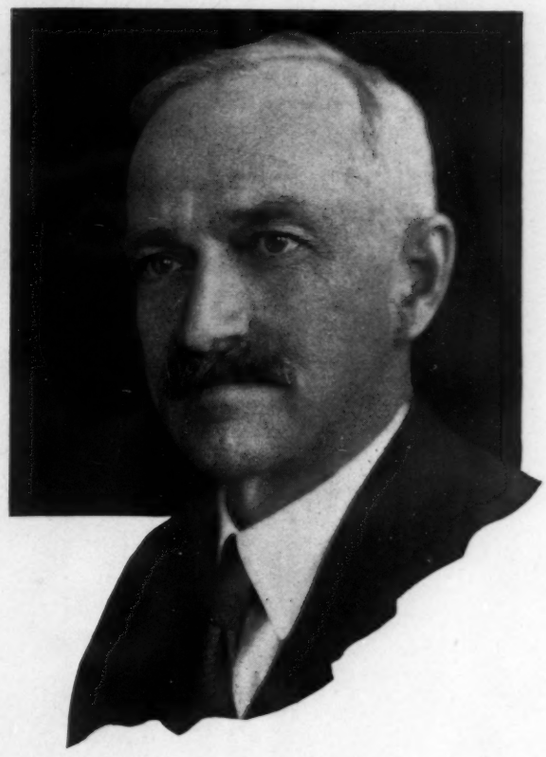
WESTERN GAS
FEBRUARY, 1936

Guest Editorial

SPOTLIGHT FOR GAS SERVICE

By HERMAN RUSSELL

President, Rochester Gas & Electric Corporation
Chairman, American Gas Association Committee on National Advertising



THESE are not "horse and buggy" days but "*gas* buggy" days, and in these days, more than ever, it pays to advertise. The gas industry does have something to sell—a modern product, quick-acting, silent, dependable, economical and safe, whether at home or in the plant.

That product, however, is one of those essential services which the consumer takes for granted unless it is dramatically impressed upon his attention. The "Forgotten Man" of today, in industry at least, is the gas man, and he will continue to be so until he takes measures to project himself into the limelight.

We do not need to go far to discover why gas is not a symbol for modern convenience in the public's mind. There has been no attempt on a national scale to make it so.

To draw a lesson from contrasts, look at the electric industry's advertising record. In 1934 this industry put nearly 3¼ million dollars into national magazine advertising on domestic appliances (radios not included). At the same time the gas industry was spending less than 400 thousand dollars in national magazines. It is no accident that electricity has become almost a synonym for "modern" in the average citizen's mind.

We have hidden our light under a bushel, and this is the time for it to emerge as a beacon to guide and inspire every company's local efforts.

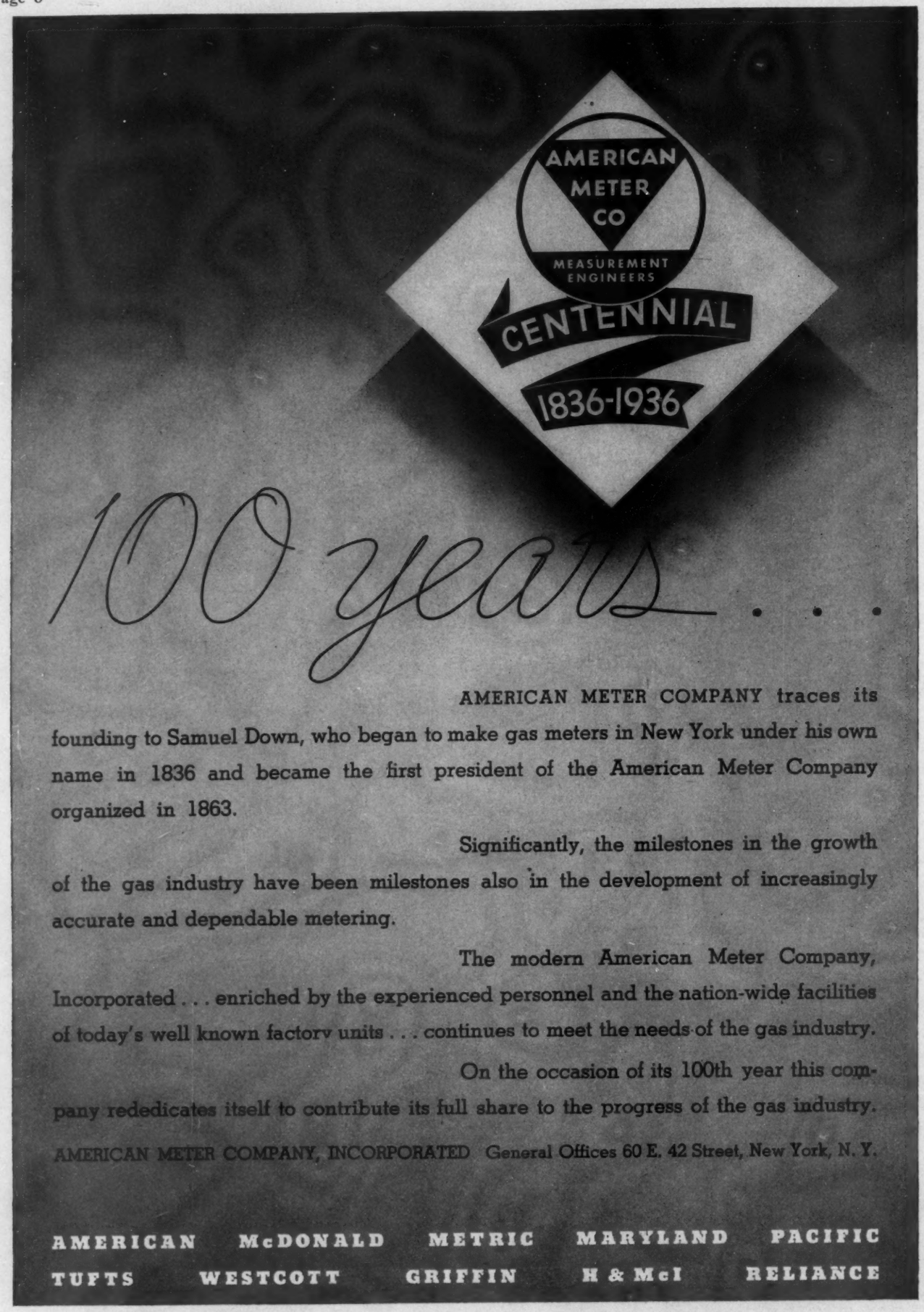
National advertising on the scale contemplated in the campaign now being set up can do wonders to enhance the position of gas with the public. It can do wonders, too, for the gas industry within itself, for a strong national publicity effort behind gas service cannot help but prove a psychological stimulus to every worker in the industry.

Now is the time for this appeal—not later. The tremendous market now available through new building and modernization is a direct goal. In this situation as in many others an attack is the best defense; every added day of delay makes our position less secure in the battle of the fuels.

And the gas industry does have something to talk about. Its history can be romanticised, while its service of today is being heralded as the last word in modern efficiency. Its appliances excel in comparison with those of competing fuel services. But they must be sold, and they can be sold to best advantage against a background of national advertising for gas.

Every alert gas man knows of the inroads which have been made by other fuels in recent years in basic fields of gas use. That these inroads are being made against a more efficient and less costly service makes it clear that the gas industry has neglected some of its primary obligations and opportunities. Certainly, measured in terms of national advertising, it has failed woefully in taking its story to the public.

National advertising will support, not supplant, the local advertising of individual companies. The challenge to the gas industry can only be met by building up a better public appreciation for the value of our service. This is a task for the whole industry. National advertising will give gas at least a share of the spotlight which now plays upon competing fuels.



AMERICAN METER COMPANY traces its founding to Samuel Down, who began to make gas meters in New York under his own name in 1836 and became the first president of the American Meter Company organized in 1863.

Significantly, the milestones in the growth of the gas industry have been milestones also in the development of increasingly accurate and dependable metering.

The modern American Meter Company, Incorporated . . . enriched by the experienced personnel and the nation-wide facilities of today's well known factory units . . . continues to meet the needs of the gas industry.

On the occasion of its 100th year this company rededicates itself to contribute its full share to the progress of the gas industry.

AMERICAN METER COMPANY, INCORPORATED General Offices 60 E. 42 Street, New York, N. Y.

AMERICAN McDONALD METRIC MARYLAND PACIFIC
TUFTS WESTCOTT GRIFFIN H & McI RELIANCE

February, 1936

WESTERN GAS

"Reg. U. S. Pat. Off."

Vol. XII, No. 2

LOS ANGELES—810 South Spring Street . . . . . 1064 Peoples Gas Building—CHICAGO

Federal Trade Commission Calls for Regulation of Natural Gas

ON January 10 the Federal Trade Commission brought in its report on the natural gas industry. A year ago the same commission submitted to the Senate its final report on the electric power industry, out of which grew the Public Utility Act of 1935. So the gas industry's interest in the Commission's present recommendations for federal and state regulation of natural gas is easily understood.

Incorporated in the report is a study of the industry's physical makeup and the capital structure of leading holding and operating companies. Methods of financing new enterprises, control of gas reserves, and the interstate character of natural gas operations also come in for extended attention.

After pointing out a group of "evils" inherent in the present organization of the natural gas industry the report recommends consideration of legislation along several definite lines, both by states and federal government. Briefly summarized, the recommendations are as follows:

1. Natural gas producing states should enter into compacts with each other making provision for state conservation laws, with state boards to set up production quotas and other measures for effective conservation. A federal agency should be given power to carry on continuous investigation, on the basis of which recommendation should be made to the state boards on amounts to be produced. Introduction into interstate commerce of gas produced in excess of state quotas should be prohibited by federal legislation, with enforcement provisions similar to those introduced for petroleum.

2. State compacts and state legislation should provide for unit operation in each producing field, with provision for common purchaser or ratable taking, or for transportation of independently produced gas by pipe line operators under contracts subject to the approval of public authority. State legislation in the above particulars should be reinforced by federal statute, making it illegal to transport gas in interstate commerce in violation of such state requirements.

3. Interstate natural gas pipe lines should be regulated as to rates (either for transportation, or city gate charges, or both), security issues, and intercorporate relations. If subject to federal regulation, retail rates should be regulated only where they are not subject to state regulation.

4. The same federal agency set up to administer the foregoing regulations should have authority to order extensions of service to communities desiring natural gas, with due consideration to present load on pipe line facilities, market obligations, expectation for expansion of present markets, etc.

5. Divorcement of gas and electrical utilities should be required, with proper limitations as to time and place.

6. Federal and state legislation is recommended which will restrict banks to investing in, and will forbid their control and management of, utilities.

7. The Commission renews its previous recommendations for a plain and clear prohibitive statute to outlaw practices which should not be permitted to exist.

While many of the recommended regulations parallel those proposed earlier by the Commission for the power industry, it is to be noted that some care is taken to avoid treading on the toes of state regulatory and legislative bodies. Also a caution is inserted that such regulation as is set up should not invade the field of management.

Conservation comes first in order of importance among the Commission's recommendations. The report points out that conservation of natural gas as a national resource is primarily of national concern, but that under the constitutional system it must be achieved largely through state legislation.

Since individual states cannot limit the transportation of gas beyond their borders, or fix pipe line rates on gas imported from other states, the report calls for a grant of federal power to act in this field, with federal regulation of wholesale rates on all gas entering into interstate commerce.

Action Near on Detroit Line

MOST of the obstacles holding up construction of the natural gas line joining Detroit to the Panhandle Eastern Pipeline Co. system fell away late last month, giving reason to look for speedy consummation of the project. Panhandle Eastern contracted with Detroit City Gas Co. last August, but an anti-trust suit against Columbia Gas and Electric Corp., which controls Panhandle Eastern, prevented operations from getting under way.

In a consent decree entered into between the Department of Justice and the Columbia G. and E. on January 29 the latter agreed to take no part in management control of Panhandle Eastern. Following the above action executives of the Columbia organization announced plans to finance the 300-mile link between Detroit and the Panhandle Eastern Pipeline Co.'s transmission line. No public financing is contemplated for the project, which will call for an eventual outlay of some 18 million dollars.

Government Competition Reviewed

FROM the National Association of Manufacturers, 11 W. 42nd St., New York City, may be secured a report of this organization's Committee on Government Competition, recently adopted after a thorough study of federal activities in a wide field of industry and business. Utility readers will find of special interest not only the section on government power projects, but also that on use of the "government corporation" device in recent federal business undertakings.

The report calls for liquidation of government enterprises competing with private business, and makes 10 specific recommendations for a national policy which should guide in government industrial operations—among them the sale or lease to private operators of electric power facilities now built or under construction.

PANHANDLE WASTAGE

Dissipation of Natural Gas Reserves Continues, Shortening Useful Life of World's Largest Field

NOT SINCE THE ruthless devastation of the West's timber resources by the early lumber barons has the nation witnessed such wholesale squandering of natural wealth as occurs daily in the Texas Panhandle. Mid-Western population centers see their future fuel reserves shrinking; pipeline operators see their investment in field acreage diminish in value—but the waste goes on. How has this sorry state of affairs come to pass? To what proportions has the loss grown to date? These and other phases are dealt with in this article, which reviews the Texas Panhandle situation from the standpoint of the gas pipeline operator.—EDITOR.

GAS blown to the air in the Texas Panhandle Field from gasoline plants alone averaged 1,044,936,000 cubic feet per day during the first seven months of 1935, and this operation is still in effect. This daily wastage is more than the total amount of natural gas consumed daily for domestic purposes in the entire United States. During the period from January 1, 1932, through July, 1935, the total amount of natural gas blown to air from gasoline plants in the Panhandle Field was 749,258,905,000 cubic feet, an amount sufficient to supply the total domestic consumption of the nation for over two and a half years. This wastage of a natural resource is inexcusable.

Effect of Wastage

If the policy now pursued in the field continues, there is nothing to prevent the amount of gas wasted from doubling or tripling, in which case a serious decrease in the amount of oil recovered will result and the life of the Panhandle Gas Field will be reduced from early conservative estimates of 20 years to less than 10 years.

Since the Texas Panhandle Field is the largest known single gas field in the world and is the natural gas supply source for most of the cities in the Middle West, comprising a population of over 7 million people, this wasteful dissipation of natural gas reserves is a national disgrace.

Cause of Wastage

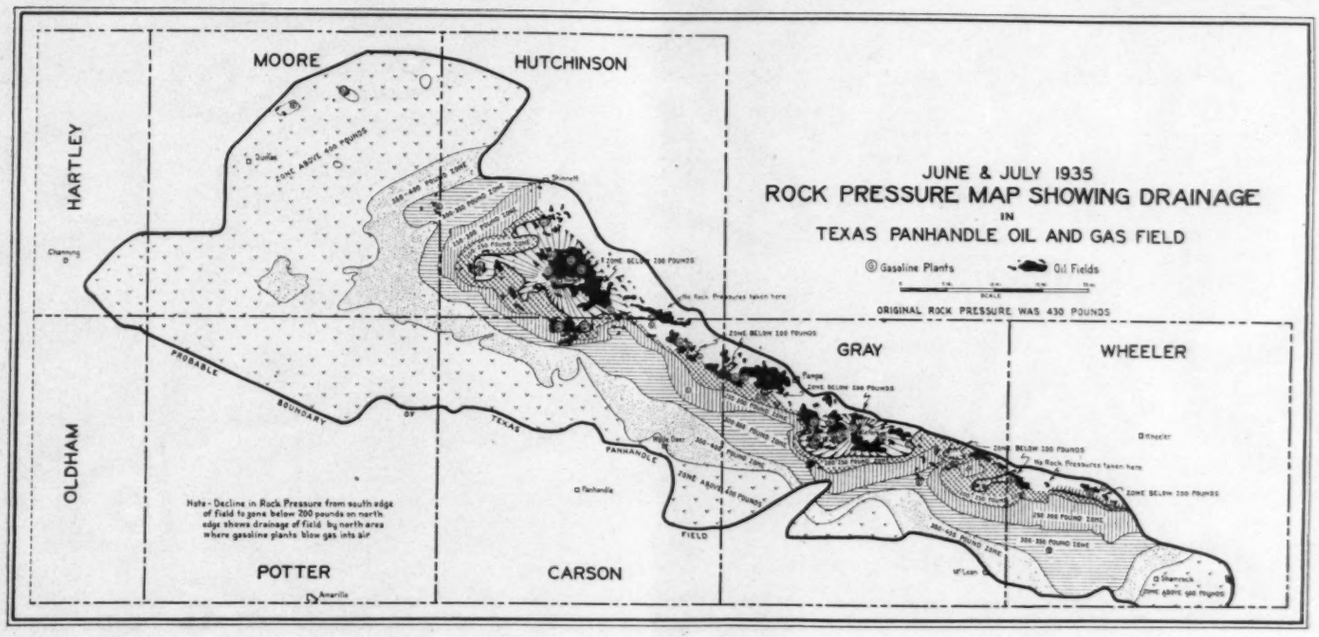
Although the Texas Legislature had passed a conservation law effective March 28, 1899, to protect underground deposits of oil and gas, no administrative body was appointed until 1919 when a general conservation law was passed providing that the Railroad Commission of Texas should administer and enforce it. The Act of 1919 provided for the protection of gas reserves in the state against waste and wasteful utilization. When the Act of 1919 and previous acts were recodified into the Revised Statutes of 1925, the penalty clause covering enforcement of rules and regulations of the Railroad Commission was omitted, thus barring enforcement of the Commission orders during the oil development in the Panhandle Field from 1926 to 1929. During this period an immense wastage of gas occurred through improper completion of oil wells, which allowed great volumes of dry gas to be produced with oil and used as casinghead gas. Much of the residue was wasted into the air. On March 29, 1929, penalties were restored to enforce Railroad Commission regulations, but although the field had many improperly completed oil wells, some with gas-oil ratios exceeding a million cubic feet of gas per barrel of oil, the Railroad Commission did not establish any gas-oil ratio until December 30, 1932, when an order was issued reducing the allowable gas-oil ratio to 25,000 cubic feet to one barrel of oil, but this was immediately nullified by the issuance of permits by the Railroad Commission to process dry sweet and sour gas and blow the residue to the air, less than two months after issuance of its gas-oil ratio order.

On April 25, 1933, the 43rd Legislature of Texas passed Chapter 100, G.L. of 1933, allowing the processing of gas for gasoline manufacture up to 25 per cent of the open flow of wells producing natural gas only (sweet or sour). Thus the wasteful practice of stripping was legalized (Until August 1, 1935, when House Bill 266, Chapter 120 G.L. 44th Legislature, Regular Session, the "Gas Waste Statute" became effective).

House Bill 266, Chapter 120, G.L. 44th Legislature Regular Session, the "Gas Waste Statute" was passed by the Texas Legislature on April 30, 1935, and became effective on August 1, 1935. This act provided for the stopping of the stripping of dry sweet gas and prohibited the use of dry sweet gas residue for carbon black manufacture and prohibited the use of dry sour gas unless the residue should be used for carbon black. It also defined an oil well as one with a gas-oil ratio of 100,000 cubic feet to one or more barrels of oil and gave the Railroad Commission authority to determine the market demand for both sweet and sour gas and to allocate the market ratably to all wells in the Panhandle Field. It also gave the Commission authority to determine the reasonable drainage for a well.

The Railroad Commission put forth an order under this statute with which operators took issue on the grounds that it provided for "unratable" proration and was inequitable in determination of market demand. Injunctions were secured in Federal Court against its enforcement, both by strippers and the gas pipeline companies. In the meantime, pending the settlement of this litigation, stripping of gasoline is proceeding and the wastage of gas goes on.

To summarize, it is evident that wastage in the Panhandle Field up to 1929 was due to lack of proper laws to back up the enforcement of conservation. From 1929 to April 25, 1933, the Railroad Commission did not enforce any gas-oil ratio in the field and permitted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HARTLEY
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POTTER
CARSON
GRAY
WHEELER
JUNE & JULY 1935
ROCK PRESSURE MAP SHOWING DRAINAGE
IN
TEXAS PANHANDLE OIL AND GAS FIELD
Gasoline Plants
Oil Fields
ORIGINAL ROCK PRESSURE WAS 430 POUNDS
PROBABLE BOUNDARY OF TEXAS PANHANDLE FIELD
Note - Decline in Rock Pressure from south edge of field to zone below 200 pounds on north edge shows drainage of field by north area where gasoline plants blow gas into air

FIG. 1.

waste to continue. On April 25, 1933, the Texas Legislature sanctioned the wastage of gas, which occurred from that date until August 1, 1935. Wastage since that date is the outgrowth of the Railroad Commission's orders and resulting litigation.

Description of Panhandle Field

The discovery well in the Panhandle Field was a gas well drilled by the Amarillo Oil Company in Potter County, December 6, 1918. The first oil well was completed April 6, 1921, in central north Carson County. From then on there was scattered wildcat drilling in search of oil. The oil field is now over 90 miles long, covering about 150,000 acres of fully developed land, consisting of over 27 different pools, most of which are along the north edge of the field. The total oil and gas field, as defined by developments up to July, 1935, is 125 miles long with a width ranging from 12 miles to 38 miles, and covers a total of over 1,400,000 acres, of which over 1,000,000 acres contain sweet gas and over 400,000 acres sour gas. This field covers portions of Hartley, Oldham, Moore, Potter, Hutchinson, Carson, Gray and Wheeler Counties, and the probable boundary of the field is shown on the rock pressure map illustrated in Fig. 1. In central Potter County about 10 miles south of the boundary shown, is what is known as the "Cliffside Structure," which produces gas carrying helium and is reserved for the U. S. Government. For the purposes of this discussion, this helium gas field is a separate field from that which is known as the Panhandle Oil and Gas Field and the statistics here given do not relate to this helium gas field, which is on a separate geological structure and is under U. S. Government control.

The following statistics show the true magnitude of the field:

Oil Field: The oil field had on October 1, 1935, 2,596 oil wells with a potential of 571,939 barrels per day. Under proration schedules, production averaged 60,445 barrels per day during the first seven months of 1935. Total oil produced from the beginning of the field through July, 1935, is approximately 243,979,675 barrels. (See Table No. 1).

Gas Field: The gas field on October 1, 1935, had 1,065 gas wells with an open flow volume of 16,668,355,000 cubic feet. Of these wells, 219 were sour gas wells with a potential open flow volume of 1,899,472,000 cubic feet. Sweet gas wells totaled 846 with a potential open flow volume of 14,768,883,000 cubic feet. Production of gas averaged 2,472,566,000 cubic feet per day during the first seven months of 1935, of which gas blown to air from gasoline plants averaged 1,044,936,000 cubic feet per day. Total gas produced from the beginning of the field through July, 1935, is approximately 5,210,499,857,000 cubic feet. (See Table No. 1).

Gasoline Production: In July, 1935, there were 50 gasoline plants in the field, five of which "scrub" gas for gas pipelines. Production averaged 20,887.6 barrels, or 877,279 gallons, per day during the first seven months of 1935. Of this gasoline, the gas pipeline scrubbing plants averaged 1,681 barrels, or 70,602 gallons per day. The balance, produced by strictly gasoline plants, averaged 19,206.6 barrels per day, or 806,677 gallons per day, which was at a rate of 0.448 gallons per thousand cubic feet of gas consumed.

It is interesting to compare the amount of gasoline produced per thousand cubic feet from gasoline plants (excluding pipeline scrubbing plants which use dry gas) with the year 1932. The amount of gasoline produced per thousand cubic feet in 1932 from strictly gasoline plants was 0.7370 gallons. The decrease since that time in gasoline content of gasoline plant gas is due to the progressive increase in the field of the use of dry gas for gasoline production.

Total production of gasoline during the first seven months of 1935 was 4,428,174 barrels, equal to 185,983,308 gallons. Total production of gasoline from the beginning of the field through July, 1935, has been approximately 1,949,437,613 gallons.

Utilization of Gas

The utilization of gas in the field naturally falls under three main headings, viz:

1. Gas used by gas pipelines.
2. Gas used by gasoline plants.
3. Gas used for fuel in drilling wells and for field operations.

Gas used by gas pipelines is used for light and fuel and none of it is blown into the air or wasted. Gas used by gasoline plants is used for gasoline pro-

TABLE NO. 1

OIL AND GAS PRODUCED FROM TEXAS PANHANDLE FIELD FROM BEGINNING OF FIELD THROUGH JULY, 1935

Year	GAS PRODUCED: *Gas Used by Gas Pipelines* Total M c.f.	Daily Avg. M c.f.	Gas Used Gasoline Plants Total M c.f.	Casinghead Gas, Not Treated (Blown in Air) Total M c.f.	Gas Blown in Air & Used Drilg. Wells M c.f.	*Total Gas Produced* Total M c.f.	Daily Avg. M c.f.	OIL PRODUCED: Total Barrels	Daily Average Barrels
1926, and Earlier	15,725,533		34,300,000	92,000,000	105,400,000	247,425,533		28,066,755	
1927	8,825,598	24,179	263,800,000	144,000,000	88,600,000	505,225,598	1,384,180	38,627,056	105,827
1928	39,978,176	109,230	320,500,000	114,000,000	49,500,000	533,978,176	1,458,957	24,087,255	65,812
1929	84,767,509	232,240	395,110,000	90,000,000	55,800,000	625,677,509	1,714,185	31,503,829	86,312
1930	81,175,878	222,400	412,796,000	70,000,000	52,600,000	616,571,878	1,689,238	32,538,202	89,146
1931	86,538,708	237,092	346,255,000	50,000,000	16,300,000	499,093,708	1,367,380	21,236,843	58,183
1932	97,087,294	265,266	283,708,708	32,940,000	4,026,000	417,762,002	1,141,426	18,088,918	49,423
1933	109,179,977	299,123	333,838,516	25,550,000	4,380,000	472,948,493	1,295,749	16,662,749	45,651
1934	147,363,215	403,735	564,804,621	33,800,000	21,665,125	767,632,961	2,103,104	20,353,702	55,764
*1935	94,568,624	446,078	380,972,943	21,200,000	27,442,432	524,183,999	2,472,566	12,814,366	60,445
Total	765,210,512		3,346,085,788	673,490,000	425,713,557	5,210,499,857		243,979,675	

Note:—Gas produced 1926-1932 estimated by Victor Cotner—Geology and Occurrence of Natural Gas in Amarillo District, Texas. Bulletin A.A.P.G., Vol. 17, No. 8, August, 1933, P.P. 877-906.

* Through July

duction, and some of the residue is used for carbon black production, but a great deal of the residue is blown into the air. Carbon black consumption of gas has never equalled the available residue gas. In July, 1935, carbon black plants consumed only 515,599,000 cubic feet per day, while gas blown to air totaled 1,040,680,000 cubic feet per day.

Wastage of gas occurs when wells are drilled in, but due to the use of lubricators, modern operating is cutting this down. Gas is also wasted into the air from wells producing oil which are not connected to gasoline plants. Unnecessary wastage of this type can be eliminated by enforcement of a sane gas-oil ratio. The most objectionable wastage and the greatest in the field is that caused by blowing of residue gas into the air after the extraction of gasoline. From the beginning of the field through July, 1935, it is estimated that gas pipelines have used 765,210,512,000 cubic feet of gas, equal to 14.69 per cent of total gas used; gasoline plants have used 3,346,085,788,000 cubic feet, equal to 64.2 per cent of gas used. Total gas produced is estimated at 5,210,499,857,000 cubic feet. Table No. 1 gives statistics of total gas and oil produced and Fig. 2 shows graphically total gas produced by gas pipelines and others annually by daily averages through July, 1935. Fig. 3 shows graphically the amount of gas blown to air from gasoline plants and amount of gas used by gas pipelines in the same manner for the same period. This graph shows the continual increase in the amount of gas blown to air from gasoline plants.

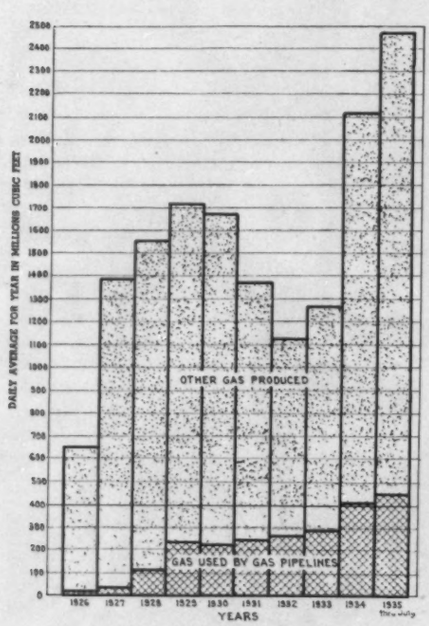


FIG. 2. Estimates of total gas produced from Texas Panhandle Oil and Gas Field —Shown by daily averages.

Drainage of Field

Fig. 1 is a rock pressure map as of June-July, 1935. This shows the effect of the oil and gas production to date, and it will be noted that the immense amount of gas produced in the oil fields and from gasoline plants has created low pressure areas along the north edge of the field where most of the gasoline plants are located. Since gas has to migrate from high pressure areas to low pressure areas, gas is now migrating to the gasoline plant area from the rest of the field, and there is no way of stopping it. In other words, the gasoline plant production is draining gas from the entire field. The two most southern plants in western Wheeler County have been operating only since February and May, 1934, and the two plants in northern Moore County and the most southern plant in eastern Carson County since 1933. They have not produced long enough to cause a rock pressure decline of the same magnitude as the rest

(Continued on Page 36)

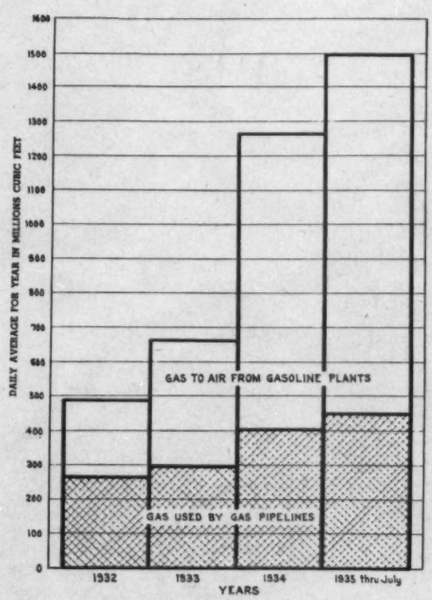
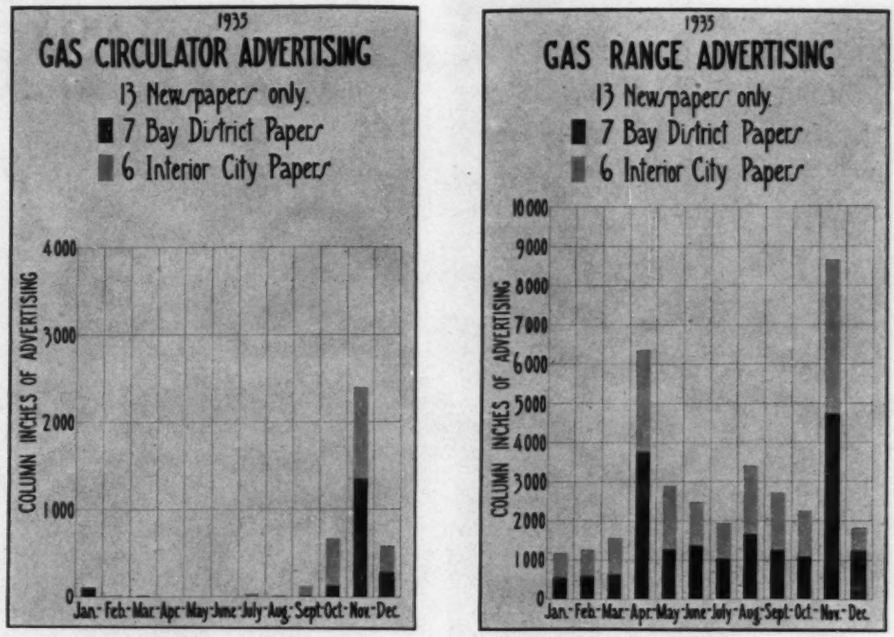


FIG. 3. Estimated daily averages for gas to air from gasoline plants, and for gas used by gas pipelines (Texas Panhandle Oil and Gas Field).



Contrasting the amount of dealer advertising in P. G. and E. territory on gas circulating heaters and on gas ranges.

WHY SHOULD A UTILITY SELL?

P. G. and E.'s Experience Supplies the Answer

By GEORGE H. FINLEY
Editor, Western Gas

RETURN of the Pacific Gas and Electric Co. to direct sale of circulating gas heaters in all sizes, after virtually withdrawing from active sale of this appliance several years ago at the request of dealers, is something out of the ordinary in marketing developments. *Western Gas* suspected that there might be some facts of general interest to utility sales managements behind the P. G. and E.'s action, and a recent interview with H. M. Crawford, general sales manager, and Bert Reynolds, manager dealer sales promotion, supplied the story.

To give the moral first, the P. G. and E. after putting the sales responsibility up to its dealers, found that its own sales promotion was the spark plug which held up the volume of dealer sales—and that without it there was no effort worthy of the name sustained by the dealers on this appliance. Some supporting detail from the company's experience will make the necessity for its direct activity on circulating heaters more clear.

As a policy of long standing the company had always sold heating equipment directly, while conducting a strong program of dealer sales promotion at the same time. Then in 1929-1930 natural gas was introduced and the necessity arose to add new load rapidly in the heating classification.

At this time there were few large dealers interested in heating equipment, as the volume of sales was relatively small. Little or no advertising was done by dealers in this field. So far as circulating heaters were concerned, this appliance was new and entirely foreign to dealers.

Looking toward quick conversion of the heating market to gas, the P. G. and E. put its efforts behind the circulator and persuaded a considerable number of dealers to add this line. By 1932 the dealers had sold so many circulators that they were convinced the market was firmly established. They now began to bring pressure to bear upon the utility to withdraw from its direct sales work, taking the stand that company salesmen were doing business that would come automatically to the dealers if the P. G. and E. were not selling.

The company finally agreed to a trial of the dealers' proposal, so far as small circulating heaters were concerned. The volume business, of course, was in the smaller sizes. Also, there was a distinct split in price between small and larger circulators when these appliances were first introduced. The company's decision was to withdraw from sale of circulators smaller than 45,000 B.t.u. hourly input, leaving the lower price, small heaters to the dealers. It was regarded as essential to continue selling the larger heaters in order to be in a position to specify adequate heat under special conditions.

In leaving the small heater field the company drew up a set of rules, on which dealers agreed, providing that:

1. Dealers should carry an adequate stock of circulators at all times.

2. Floor displays should include an operating circulator.

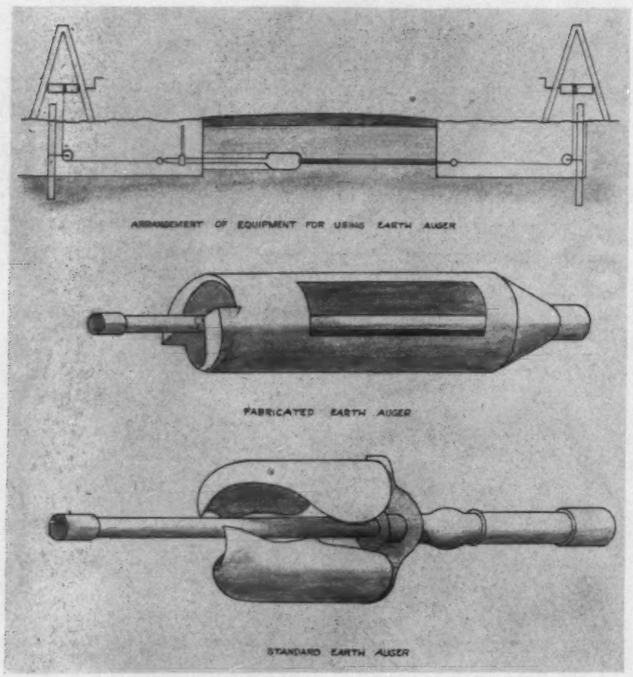
3. Dealers should conduct an annual summer heating campaign and do a certain amount of advertising; also they should make special buying inducements in the summer event, allowing a price discount and fall dating on bills.

4. Dealers should conduct a fall campaign with special advertising.

(Continued on Page 61)

Installing

By M. G. MARKLE



AT LEFT

Showing equipment and arrangement for boring under pavement, and two types of earth auger. The top one is specially fabricated from pipe the size of the hole desired; bottom one is adaptation of standard commercial earth auger.

WITH 40-foot highways and still wider intersections now to be encountered, and the prospects of greater widths in the future, the problem of installing gas mains under such highways confronts the gas engineer more often with each passing year. Pavement openings are usually the quickest and most economical way of doing the job, unless equipment is available to do otherwise. However, there are many occasions, particularly in or near large cities where the authorities and traffic conditions will necessitate doing the work without disturbing the surface of the pavement. It is therefore most desirable to be prepared with full equipment and tried methods, to make a crossing without breaking pavement or interfering with traffic.

Highways up to 20 feet in width, laid on reasonably firm soil, do not present a very great problem since they can be tunneled without the use of cribbing. However, if the soil is crumbly and loose, or if the pavement is wider than 20 feet, the engineer is forced to adopt one of many mechanical means of installing the pipe.

A careful study and a number of trial cases revealed that there is one best method for each particular case, and that method should be one of three, depending upon the conditions to be met. The size of pipe, the kind of soil to be encountered and the length of pipe to be installed under the pavement are the determining factors for the method to be used. The three methods referred to are pushing, boring for medium sizes of pipe, and a combination of pushing and tunneling from the inside of the pipe for the large diameters.

We shall not discuss the installation of 4-inch pipe and smaller since it can be installed with the ordinary pipe pushing machine and this method is common practice.

Six and 8-inch pipe may be pushed very satisfactorily but requires the use of a hydraulic jack of about 50-ton capacity. A jack of this size and the force required to push the pipe naturally require a good backing, and the end from which the pushing is to be done should be chosen with this in mind. With this point chosen, a ditch should be dug butting up to pavement on one end, and of sufficient length to take a 20-foot random length of pipe plus a hydraulic jack and blocking. This ditch will have to be enlarged at the pavement end to allow for position welding; it should be shored completely and planked solidly on the bottom for a floor. At least three dollys, distributed equidistant under the length of pipe on the floor, provide a means of leveling the pipe. Grading the pipe level and providing about 4 feet of cover below the surface of the highway will prevent cracking of the pavement and result in the least deflection of the pipe. With the jack in place against good heavy blocking at the end of the ditch, the set-up is complete.

A pointed or bull-nosed end is not to be used because it is more liable to cause deflection. With a straight open end the dirt fills into the end of the pipe about 18 to 24 inches and forms a natural soft nose that will absorb or deflect any small obstruction. The open end also has the added advantage of cutting directly through many obstructions such as roots and old abandoned culverts and sewers where a rounded or sharpened end would cause deflection of the pipe. The maximum amount of deflection in a 100-foot push job may be possibly 3 inches; however, it usually will remain level for the full length.

If it is desired to coat the pipe, it should be done with a high melting point bituminous coating applied after the pipe has passed the last dolly. This type of coating, unwrapped, will pass through any ordinary soil without injury. However, a sleeve welded to the end of the pipe to enlarge the hole slightly affords a good protection for the coating.

M. G. MARKLE

In order to give some indication of what can be accomplished by this method, a gang of six men with a 50-ton hydraulic jack with a 12-inch stroke will average 1 foot per hour on a 75-foot job. A jack with a longer stroke will increase this rate since it would require fewer changes of the blocking for each length of pipe pushed. The limitation on the length of the push is dependent on the control of the pipe rather than the power required. Two hundred feet is probably the maximum distance that can be attempted safely.

Six and 8-inch pipe also can be installed with the use of an earth auger. This may be the preferred method since hydraulic jacks of the size required are not always available. However, the boring job cannot take care of the exceptionally long job or one where the soil is unsuitable.

For pipe sizes of 10- to 24-inch diameter, the earth auger is the only practical method available. Hand power applied with chain tongs can be used for boring holes up to 15 inches in diameter. Above that, some form of power must be applied to turn the auger.

The earth auger itself may be either

Gas Mains Under Highways

Public Service Company of Northern Illinois

a home-made affair or an adaptation of the commercial earth auger. The former is heavier and more costly but is also faster since it is larger and will hold more dirt before requiring removal for cleaning. Being of heavier construction it will grind and work its way through obstructions that would easily stop the standard earth auger.

The home-made auger is constructed from pipe the size of the hole desired, the length being about four times the diameter. Cutting edges on the front end are made of hard steel to prevent wear; they form one edge of an opening about 3 inches in width, which allows dirt to enter and accumulate inside the auger. The tail end is provided with a coupling for attaching pipe for turning purposes, and this, of course, varies with the size of the auger. The front end is also provided with a coupling, centered and welded to the cutting blades to serve as a guide and, when necessary, as an additional means of applying pressure to the cutting blades. The barrel of the auger has an opening for removing the dirt.

The only change necessary for adapting the commercial earth auger to this work is to provide coupling connections for a tail and a guide as described for the fabricated auger. The low cost of this equipment makes it very desirable where many different sizes are required.

Both types of augers are operated by the same method. A lead pipe of 2-inch steel is pushed through on line with the proposed hole as a guide and also as a feeler for large obstructions. Equipment for applying pressure to the cutting edges of the auger is then set up. It may be either a winch pulling through a swivel joint on the guide pipe extended through the 2-inch lead pipe, or a jack pushing on the tail pipe through some form of a thrust bearing. Either auger is rotated with chain tongs or Parmalee wrenches applied to the tail pipe.

Large stones, old culverts, or sewers, are probably the worst obsrtuction to this type of installation since it will always necessitate starting over, or a real tunnel job to remove the obstruction. Stones up to 3 inches offer no resistance and soft rock or large roots can be worn through with the cutting edges. If the boring is being done in so-called hardpan clay, it is usually necessary to use water with the auger to soften the clay. Soft, loose, crumbly soil should never be attempted because of the possibility of cave-ins, which might result in the loss of the auger or a pavement opening to recover it. Wet sand is acceptable and can be bored as easily and as safely as clay.

With the boring method, as with the pipe pushing method, it is necessary to use steel welded pipe, but the coating need not be a high strength coating. An asphalt coating with a strong and well bonded wrapper can be dragged into the bored hole with no serious damage.

The maximum distance that can be bored is dependent on the type of soil encountered, and the ability to push the lead pipe to grade. In average soil the limit is about 80 feet, which is ordinarily sufficient to clear the widest pavement.

With this equipment and method of boring holes, as much as 40 feet per 8-hour day can be attained with the smaller sizes in good soil, while the average for a number of jobs indicates about 3-feet per hour with four men operating a hand-driven device. Power-driven machines naturally should be as fast or faster than hand-driven jobs even though the equipment is heavier and more bulky.

Steel pipe that is 30 inches in diameter or larger can be installed, at a reasonable cost, by forcing it with two hydraulic jacks while it is being tunneled from the inside. Almost any type of soil, even to shale rock, is acceptable for this method. If cast iron pipe is desired, a corrugated casing, 12 inches larger than the cast iron pipe, may be jacked in by the same method, and the pipe pulled through. This will allow the use of any of the rubber gasketed flexible joints now available. If the pipe is of such size that pulling it into the casing might injure or disturb the joints, it can be moved into position by floating it on water. This is done by making up, capping and leveling the full length of pipe in the ditch outside of the casing and then filling the ditch, casing and all with sufficient water to lift the pipe until it is concentric with the casing. The pipe can then be moved very easily into position inside the casing and the water pumped out of the ditch until the pipe has settled into its final position.

All of the methods described have proved to be very successful in the Chicago area where wide highway intersections with very heavy traffic conditions are encountered with every main extension of any length. They have also been an economical and most invaluable means of crossing railroad rights-of-way of exceptional widths. From the experience and good results we have had with these three methods, we feel confident that we could attempt any reasonable installation and be sure of success, with costs equal to or very little more than if the pavement had been opened up completely.

GROWING WITH THE INDUSTRY

THE GAS industry added more than 200,000 new consumers in 1935. WESTERN GAS during the same period added 96 advertising pages, and increased the volume of its editorial material approximately 25 per cent. Distribution of this issue is 300 copies greater than that of a year ago.

Ninth International Petroleum Exposition Arrangements Progressing

FIVE hundred manufacturers of oil industry equipment, as of January 21, were already on the list of exhibitors for the ninth International Petroleum Exposition to be held at Tulsa, Okla., May 16 to 23. In addition to these, there will be a number of scientific displays covering various branches of the industry, according to W. A. Schlueter, chairman of the Scientific and Technical Committee.

Meetings to be held in conjunction with the Exposition at Tulsa that have been scheduled to date are the spring meeting of the American Petroleum Institute, Natural Gasoline Association of America, Independent Petroleum Association of America and the National Stripper Well Association. A First-Aid and Safety conference and demonstration is being planned in which oil companies will enter teams.

SALES . . . through Kitchen Planning

By HARRY SWENSON

Director, Kitchen and Basement Planning Bureau, The Peoples Gas Light and Coke Company
Chairman, Home Modernization Committee, 1936, American Gas Association

NOW in its second year of operation, the kitchen planning bureau of The Peoples Gas Light and Coke Co. in 1935 was visited by 14,000 callers, and designed some 200 kitchens. Most of the plans soon were translated into completed kitchens, gas-equipped of course, and many of them led to all-gas homes.

Kitchen planning, given a fair trial, proves itself to be a definite sales aid and is an excellent example of modern service-selling technique, says the author of this article. Mr. Swenson, in WESTERN GAS for February, 1935, had other interesting observations to make on kitchen planning.—EDITOR.

IN recent years less buying has taught us leisurely buying. It has also taught us the difficulty of selling an article of merit on merit only. Today we are in an era of "service-selling" confined to no narrow range of articles but extending over the entire merchandise catalogue from oil for your car to cosmetics for milady. Selling with service has become acceptable business fashion, an arrangement extremely satisfactory to seller as well as buyer. It is a sales method particularly well suited to gas appliance merchandising, partly because where the sale involves an article designed for long time use it is of utmost importance to make satisfaction last the life of the article.

Selling through kitchen planning has been found profitable not only by gas companies but by other interests whose gains lie in the sale of kitchen equipment. For that reason alert business is peering into the kitchen, and with a good objective, for here is an almost untouched field of profit that has lain fallow too long. No part of the average home has been more neglected during the dark years and now it loudly claims attention.

As merchandisers with a taste for analysis can see, the pendulum is swinging the other way. Everyone knows that an astounding number of homes are ripe for introduction to new equipment. It is not now a matter of replacing a single unit or appliance; the need is for thorough modernization.

But besides the need for replacement there is another element to be reckoned with; almost imperceptibly we are approaching a new era in home management and functionalization of space and equipment. City crowding, woman's contact with business, the penetration of advertising and modern food marketing, result in application of new ideas to the kitchen.

Women, especially in the last years, have placed a higher value on time, a fact encouraging to manufacturers of labor-saving devices. A wider horizon brought into view new and fascinating interests with an ever increasing demand on time. No alert woman is going to waste time on chores and duties that can be taken care of by automatic equipment if this equipment can be placed within reach and its value to her is convincingly stressed.

Until now the average kitchen has shown no noticeable advance over the kitchen of our childhood. In general it is now as it was then, poorly arranged for its function and seldom thought of as a place for artistic treatment.

The advent of the well designed range and the super-styled refrigerator revealed to women pleasant possibilities in lines and colors and created an awareness of existing kitchen efficiency. It emphasized how utterly old fashioned the kitchen really was—so out of date that in many instances the purchase of a new appliance was deferred for the reason that everything else was out of key. But if that was the case on one hand it was also true that the buying of one good-looking piece of equipment led to an exhilarating adventure in the realm of arrangement and decoration. That this will always be a pleasure to women needs hardly be alluded to. The appeal of beauty is never unheeded.

Because of advertising and tightened purse strings, women are smarter shoppers than formerly; taste is improving and quality is demanded. No woman buys a range or for that matter anything else with only its functional value in view. Certainly she wants a new and better range because it means more leisure and, with the thought on economy, it means assured cooking success and added prestige as a home-maker. But besides this she wants good-looking objects in her surroundings. She wants beauty. Business is grateful that women have an intense horror of that which is out of fashion and that they have such a pronounced love for beauty.

When a woman buys a hat she buys it with a view to its relationship to her other clothes and her coloring. So also when she buys a range or a refrigerator she naturally relates it to other equipment, existing or new, and the conditions and appearance of the kitchen. If this relationship is obscured the purchase is delayed and it is to the seller's obvious advantage to make it clear. When clear and enthusiastically painted the sale is as good as made. This is a stimulus to action, the basis of advertising and selling.

A kitchen planning activity rightly conducted furnishes excellent stimulation to the prospective buyer of gas appliances. Viewed from any angle kitchen planning presents only agreeable sides. It is an activity of three phases, each distinct and each advantageous to the gas company, operating as it does in behalf of advertising-service-selling. Even a cursory glance admits that kitchen planning does a good job of advertising, showing the gas company's very best side. Closer examination reveals that it does a penetrating and lasting job of this advertising and does it at a surprisingly low cost. It is a splendid extension of service to improve and maintain good public relations, serving not only the customers but the manufacturer, the merchant, the architect and the builder. But the justification of this service must show itself by more tangible results than good public opinion. Kitchen planning is also a sales activity and proves itself as such.

Value is established by appreciation and public acceptance is usually testimony of merit. The Kitchen Planning Bureau of The Peoples Gas Light and Coke Co., now operating in its second year, proves both points. Customer acceptance of this service-selling has been gratifying and resulting sales make a pleasant figure on the books. The Bu-

(Continued on Page 34)

Devices of Construction and Operation

● SELECTED from Pacific Coast Gas Association Sub-committee Report on Devices, Contrivances and Novelties of Construction and Operation; Otto Goldkamp, San Diego Consolidated Gas and Electric Co., Chairman.

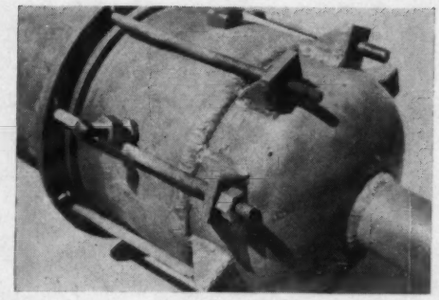


FIG. 1. Emergency line repair head.

EMERGENCY REPAIR HEAD

A. E. ENGLEBRIGHT and J. E. Currens, Pacific Gas and Electric Co., submit an Emergency Line Repair Head, illustrated in Fig. 1. These heads are made in pairs, by cutting a Dresser Coupling in two and welding on a blind flange or bump head.

The purpose of the clamp is to offer a means whereby a break or long injured section may be by-passed or temporarily repaired quickly without the necessity of welding, bull heading or heating the pipe and hammering it together. The connection can then be made cold to by-pass by means of a Dresser.

The method of installing the emergency head clamp on the main is the same as would be used for installing a Dresser coupling with the addition that there are set screws to be tightened.

The most outstanding advantage of the emergency head clamp is the "time factor." It requires a relatively short time to install, whereas the other methods named above, require the heating and bending of the pipe; also the tapping and welding of the main to install a by-pass.

With the installation of the emergency head clamp the connections for the by-pass and clamp are installed as a unit.

THREE-WAY PILOT VALVE

E. H. Fisher, Coast Industrial Gas Co., describes the Three-Way Pilot Valve, illustrated in Fig. 2.

Certain types of pilot operated regulators, or other automatic controls, call for a three-way valve, which is easily constructed from standard parts and has the advantage of using common automobile tire valves, thereby eliminating the grinding and adjustment of seats.

Two tire valve stems, A and B, are brazed into a 2-inch pipe cap. The valves shown are of the cap type. The core type is satisfactory but has slightly less capacity.

The valve actuating rod, C, is a shipping stop from a differential gauge. On the rod are three bushings from the same source. A packing gland around the rod is made from a 1/8-inch pipe coupling.

An additional connection, D, carries the pressure from inside the chamber to the diaphragm or other device to be operated. The valve chamber is closed by a pipe nipple with the lower end

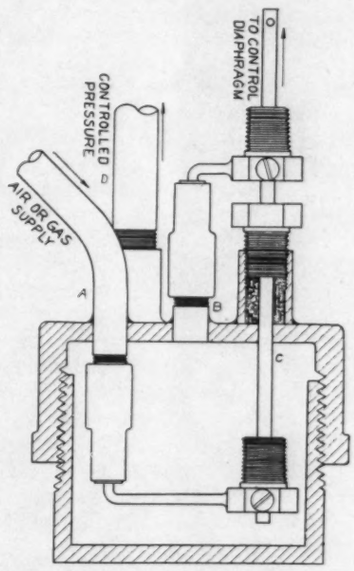


FIG. 2. Three-way pilot valve.

welded shut. This nipple is readily removable for inspection of the valve.

The operation of the device is apparent from the sketch. A unit such as this has been operating for several years on an automatic damper control, with an air supply pressure of 80 pounds. If the inlet valve develops leakage, as it has a few times, the entire element is replaced at a cost of a few cents.

TRACTOR CONVERSION

Mr. Fisher also describes the conversion of a Fordson tractor to natural gas, by an adaption of the carburetor as shown in Fig. 3.

Late models of Fordson tractors may be efficiently operated on natural gas without special equipment, and without disturbance of the existing gasoline vaporizing equipment. The tractor here described operates an ore loading shovel in a smelter and is relatively stationary as long as operating on one stock pile. Natural gas therefore can be brought in through a length of rubber hose. For moving to a different part of the yard the shovel is changed back to gasoline by the simple process of operating two valves and disconnecting the natural gas hose.

Conversion of the tractor is accomplished by connecting natural gas to the vaporizer at the cleanout opening as shown in Fig. 3. This opening can be retapped for a 3/8-inch pipe nipple. For a zero pressure governor, a spring actuated house-type regulator can be used, if turned upside down. The weight of the diaphragm then tends to close the regulator. The spring tension is backed off until about 1/4 or 1/2 inch of water suction is required to cause the regulator to open. The gas will then shut off when the engine stops. This shut-off should not be depended upon, and a valve should be installed at the intake to the governor. A needle valve at the vaporizer permits adjustment of the gas-air mixture.

This arrangement was found to work entirely satisfactorily over a wider range of load and speed than was possible with gasoline.

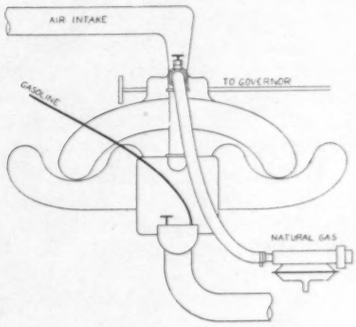


FIG. 3. Carburetor conversion for use of natural gas by Fordson Tractor.

An older tractor using the conventional carburetor was converted by making a 1/8-inch pipe tap into the throat of the carburetor for admission of natural gas.

CLEARING SERVICES

G. A. Sperry of the San Diego Consolidated Gas and Electric Co., submits a special cap for admitting wire to clear services. This device (Fig. 4) has been

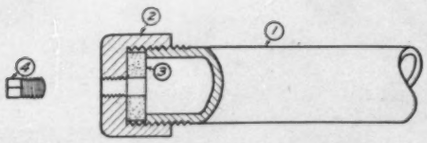


FIG. 4. Special cap for admitting wire to clear services.

found very useful in speeding up the operation. To use this cap, unearth the end of the service at the riser. After the stopcock on the riser has been opened to release the pressure that may have been built up by the little gas that passes the stoppage, remove the cap at the end of the service (1). Then screw on the special cap (2) which is just an ordinary cap that has been drilled and tapped for an 1/8-inch pipe plug (4), and inside of which has been placed a washer of soft rubber (3). Now the clearing wire may be passed through the hole in the cap and so on through the pipe to clear the service. The dust so loosened is blown up through the riser and into a "blow-can."

When the service is clear, the wire is withdrawn and the cap tightened. The rubber washer will be compressed and nearly, if not altogether, stop the gas. To make the job complete, the plug is screwed in and the service is then ready for use once more.

Recommended Procedure for Purging Gas Piping and Other Apparatus

● H. W. ALRICH, Consolidated Gas Co. of New York, chairman, Committee for Purging and Placing Gas Piping and Gas Apparatus into Service or Removing Them From Service; in report to American Gas Association Convention, October, 1935.—(Abstract by WESTERN GAS.)

THE procedure recommended applies to situations where a container filled with air is to be placed into flammable gas service, or a container filled with gas is to be withdrawn from service.

Certain mixtures of any flammable gas or vapor with air are explosive, and their existence at any stage of any operation may be prevented by complying with five fundamental requirements, which are:

1. Competent supervision.
2. Positive isolation of the container from the admission of air or flammable gas until the purging operation has been completed.
3. An adequate supply of inert gas (or of live steam).
4. Displacing the contents of the container with inert gas (or steam) and then admitting flammable gas or air, as the objective may require.
5. A reliable means of determining when the contents of the container are substantially free of oxygen or flammable gas or vapors.

These requirements are the backbone of safe procedure and there is no substitute for any of them, although there may be alternatives to the subordinate details.

"Inert gas" is gas which will not burn or support combustion; e. g., nitrogen, carbon dioxide, or combustion products substantially free of oxygen and/or flammable gases. Steam is not an equivalent for inert gas, but small containers may be purged satisfactorily with it if they can be brought up to a temperature of 180 to 210° F.

The atmosphere within the container should be tested to determine its character.

If proper arrangements can be made, the entire purging operation should be carried through continuously and completed within the daylight hours, night operations being avoided unless made necessary by special circumstances.

A purging operation should not be conducted in a spirit of haste, nor should safety be sacrificed to time, convenience or expense. However, no additional safety is secured by unnecessarily prolonging the operation.

There should be provided an adequate and reliable supply of inert gas which may be estimated as two volumes for each one volume of the container volume to be purged.

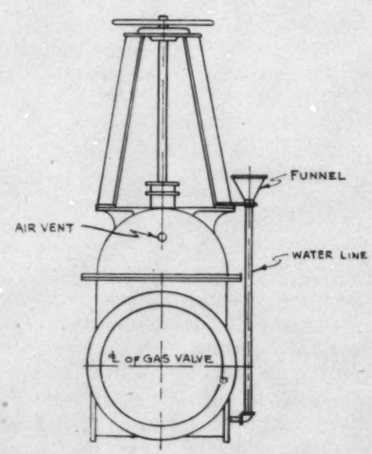


FIG. 1.

The inlet and outlet valves of all apparatus should be inspected, tested and placed and maintained in good operating condition, by which is meant ready opening and full and tight closing. Without this the intended results cannot be obtained and neglect of it introduces dangerous uncertainties. Gate valves should be provided with ample size vents from between the gates, or be equipped with piping for maintaining a water seal having a depth of twice the works inlet pressure, as shown by Fig. 1. The water should be supplied through a funnel, thus providing a sight feed and avoiding an excessive pressure being imposed upon the valve body. Valves thus sealed, when and if exposed to freezing temperatures, require heat, protection or the use of a non-freezing liquid.

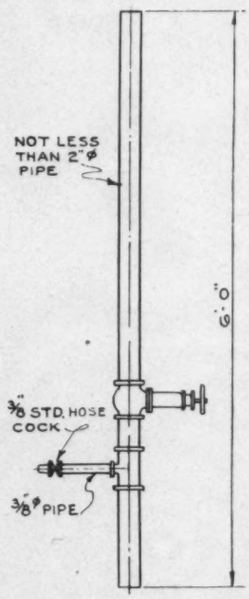


FIG. 2. Standard vent pipe.

Necessary piping, vents and accessories should be prepared in advance, and a water gauge, to show the pressure within the container, should be provided.

Standard vents with test cocks, as shown in Fig. 2, are recommended. When determining the proper size, the rate at which inert gas will be admitted into the equipment should be considered, and undersized piping avoided. The sizes, given in Table No. 1, are based on extensive experience.

Cylinders of carbon dioxide, the largest producing about 425 cu. ft., may be used for small apparatus. Inert gas from automotive exhaust, purging machines, etc., should not contain more

TABLE NO. 1.

Source of Inert Gas	Nominal Rate of Production per Hour (Cu. Ft.)	Diameter of Supply Line and Single Vent (Inches)
Automobile Engine	1,000	1½
Air Compressor Unit	3,500	2½
Two Air Compressors or Small Commercial Purging Machine	7,000	3
Medium Size Commercial Purging Machine	15,000	4
Large Commercial Purging Machine	35,000	6

than 2 per cent by volume of oxygen, or show more than 50 per cent of the lower explosive limit when tested by combustible gas indicator. One gallon of gasoline produces about 1,000 cu. ft. of inert gas.

All auxiliary piping, such as drain, test and steam lines, should be physically disconnected if directly tied in with any container other than the one being purged.

If a flammable gas container, forming a complete enclosure, is to remain out of service for an extended period for inspection and/or repairs, and essentially if it is to be entered by workmen, it should be physically severed from all piping, including the flammable gas connections, before purging, and should remain thus isolated until it is to be immediately purged and restored to service.

Precautions should be taken against all sources of ignition (open flames, matches, smoking, electrical connections, static electricity) in the immediate vicinity of the operation. Purging should not be undertaken during an electrical storm.

A competent gas analyst should be present throughout the purging operation to determine the quality of the inert gas and of the contents of the container. He should be equipped with gas analysis apparatus and a combustible gas indicator.

When the inert gas is of specified quality it may be admitted to the container and positive pressure should be maintained in the container throughout the purging operation.

When tests of the purge gas emitted from the vents show that the container has been purged to a point of safety and if the next step in the undertaking is delayed by circumstances, the admission of inert gas may be continued during the interval or all vents may be closed and a positive pressure built up in the container to offset the shrinkage of the contained inert gas. This condition may be met also by admitting steam into the container with a ½-inch pipe, exhaust steam being adequate for all but very large apparatus.

Note: Besides the general instructions given above, that have been used, the report includes details for specific types of apparatus and several appendices elaborating some of the details.

Checking Unaccounted-for Gas Losses Caused by Theft

• FRED O. PAIGE, JR., Kitson Co., Philadelphia, Pa.; addressing Mid-West Gas School and Conference, Iowa State College, Ames, November, 1935—(Abstract by WESTERN GAS).

CAUSES for lost, or unaccounted-for gas, can be grouped under three major heads. Leakage and metering, the first and second, are both engineering and operating problems. The third, stealage, has become important only in recent years and only in the past year in many places.

One gas company, serving a town of 30,000 meters, is at the present time finding four new theft cases per day, two of which are space heating. In another town of the same size, the gas company has just completed checking and repairing of lines and meters until the present condition is considered excellent, yet the reduction in unaccounted-for is only 25 per cent and this is high. A third brought its unaccounted-for from 45 per cent down to 13 in the last three years. Reemployment has been an important factor but the real reason for the reduction is an energetic campaign on all fronts, leakage, metering and stealage. Newspaper advertising was used to teach the hazards of tampering with gas mains, thus gaining the assistance of property owners. An efficient theft department has paid good dividends in this case.

A determined thief can help himself, for a time, no matter what protective devices are used, but there are also a great many amateurs taught by a certain class of dealer. Many of these are teaching gas diversion methods right under the nose of the companies' sales departments.

No protective measures will prove 100 per cent effective any more than in other departments of crime prevention. Devices can be found, or made, that will materially reduce this form of unaccounted-for, but even these depend upon intelligent inspection and supervision. The cheapest seal, with high grade inspection, is probably better than the best protective devices and poor inspection, and yet much of the latter is seen. Too often seals are used that can be bought at low cost but that require close inspection to detect tampering, with meter readers used as inspectors.

There are seals made that have to be completely shattered and cannot be pieced together. Such a seal is used to cover a cock handle in such a way that the plug cannot be removed. Another cock is made that has lock and key for plug. It is quite important that the shut-off cock plug, if in the customer's house, be locked in, in some manner.

Certain forms of meter tampering are being prevented by changing the hanging of the meter, where necessary. A certain meter-bar operation, requiring a skilled mechanic but nevertheless fairly common, can be prevented by eliminating the solid meter-bar. Those companies using the old style bar are having no such trouble.

Up to this point we have referred to services to customers presumably in good standing. In some communities the greatest trouble is caused by those technically shut off. Some gas companies entered the depression with no method of locking the service. Others used the lock-wing cock, some even padlocking these but the remainder have been using one kind of seal or another. Many customers found ways of diverting around the cock, so cutting and plugging the service just inside the customer's basement has become common. Experience is proving this method quite expensive where plugs swell, or where customers jim them. Many companies' safety requirements call for two men to plug or unplug a service and sometimes this has to be done several times a year to the same service. Other companies go outside the customer's house, dig up and plug or cap the service there. This is perhaps the most effective method of shutting off a customer but of course the service must be dug up again to restore gas to the premises.

Due to the many difficulties encountered in maintaining seals or plugs, on shut-off customers, when these are in the customer's home, there is a growing demand for some method for closing a service outside the customer's house. Although given up for low pressure services in many parts of the country, the curb-box, with a new type lid that has to be broken and thus becomes a seal, may be the answer in many cases. It would seem important that the gas company be able to control its supply from outside the customer's building. In some states fire marshals are bringing pressure to bear for such control of low, as well as high pressure, gas. Many of the old operating objections to the curb-box have been removed and further improvements are under way.

Perhaps one of the best protective measures is the employment of an inspection force, independent of meter

readers and service men, especially trained for this work. Several companies have such organizations. The special men, or inspectors, should be capable of noting trends, catching epidemics at the start and advising where special types of cocks, meter protective measures and outside shutoffs should be used.

In many states the laws are such that it is not enough for the company to prove customer diversion but someone must have seen the customer in the act of altering the company's property. Indiana has a new law that has proved very effective. This may be found in full in Indiana Acts of 1935, chapter 251, 79th session of the legislature, senate bill number 201. It provides in part as follows:

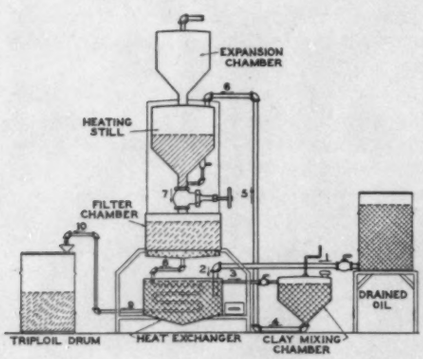
Section 2 states that "any owner, tenant, licensee, or other occupant of premises . . . who, having knowledge that any of the offenses enumerated . . . has been committed and having the right to prevent the commission . . . on conviction thereof, shall be fined not less than ten dollars nor more than one hundred fifty dollars, or be imprisoned in the county jail not less than five days nor more than sixty days . . ." or both.

Section 3 provides that "proof that any of the acts enumerated in sections 1 and 2 . . . upon or about the premises owned, used or occupied by the defendant . . . or proof of the presence at any time on or about any meter, . . . gas pipe, . . . any device . . , hose, or other conductor, designed to divert . . . gas from its proper conductor . . . without the same first passing through and being correctly registered by the meter . . . shall constitute prima facie evidence of knowledge on the part of the person, firm or corporation, having custody or control of the room or place . . . where such device . . . is located . . . and shall constitute prima facie evidence of the intention . . . to injure or defraud the . . . public utility company . . ."

Section 4 provides that "proof of the presence at any time on or about any such meter . . . resulting in the diversion of gas . . . without the same being first correctly registered by the meter . . . shall be prima facie evidence of the intent to violate . . . and the guilt of said defendent . . ."

Gas-fired Still Utilized in Re-refining Oil

ANOTHER unique industrial application of gas is to be found in the plant of the Triploil Sales Co., re-refiners of used oil, on the lines of the St. Louis County Gas Co., Webster Groves, Mo. Lubrication engineers contend that lubricating oil does not actually wear out, but becomes unusable due to contamination by gasoline and metallic particles, and by breaking down of the lighter hydrocarbons. It is only in the last few years that reclaiming crankcase drainings has been carried out on a commercial scale, the aviation industry being the first to reclaim its used oil.



Cross-sectional diagram of gas-fired oil re-refining still.

In the Triploil plant each still has a capacity of 5 gallons per cycle, and operates semi-continuously. The oil to be refined is first mixed with a clay imported from California, and the mixture forced to the heating chamber with compressed air. There it is heated to a temperature of 618 degrees with a thermostatically controlled gas burner. The lighter ends of the oil are distilled off and pass into an expansion chamber and are then led into a condenser, the condensate being utilized for penetrating oil.

After the gas is automatically shut off the remaining mixture of oil and clay is treated with steam until a temperature of 520 degress is reached. It is then drained into another chamber where it is forced through a paper filter at about 500 degrees under 15 to 20 pounds air pressure. At this stage of the cycle a new charge is placed in the still proper.

The finished product of this process is said to approximate within narrow limits its original viscosity. Companies engaged in this business claim that the re-refined oil is superior to that receiving no "motor-seasoning", the contention being that the weaker molecules are thus eliminated.

Three Arizona Towns to Have Natural Gas

FROM the 45-mile 6-inch transmission pipe line which the Western Gas Co. is building to a copper smelter at Superior, Ariz., reported in *Western Gas* for December, the towns of Superior, Coolidge and Florence will also be supplied for domestic distribution. Three-inch laterals off the Western Gas Co. line will feed the three towns. These towns have an aggregate of about 1,000 prospective consumers.

These systems are being constructed by a new company headed by Marshall A. Moody of Phoenix, who was manager of the Superior Electric Light and Power Co. for seven years. J. B. Shea, who was formerly connected with the Arizona Edison Co., is manager at Superior. Mr. Moody obtained the franchises for the three towns from Pinal County. Completion of the Western Gas Co. line was expected in February and the distribution systems shortly thereafter.

Bow Island Gas Field Repressuring Doubles Rock Pressure

REPRESSURING of the Bow Island gas field, Alberta, which was begun by the Canadian Western Natural Gas, Light, Heat & Power Co. of Calgary, in 1930, with waste gas from Turner Valley, has increased the rock pressure to 496 pounds. Over 7 billion cu. ft. have been pumped into the old field, doubling the pressure existing in 1930.

The company plans to continue storing gas in the field as long a supply is available from Turner Valley. When the Bow Island field was first opened in 1912 a reserve of about 46 billion cu. ft. was estimated. According to present estimates the field is now short about 29 billion cu. ft. of its original reserve.

Canadian Western Natural re-draws the gas from Bow Island to supply Calgary and Lethbridge.

F. A. Newton Elected Director of American Gas Association

AT the January meeting of the executive board of the American Gas Association, F. A. Newton of the Commonwealth and Southern Corp., was elected a director to fill the vacancy for the unexpired term ending November, 1936, due to the election of N. C. McGowen as second vice-president.

Mr. Newton is in charge of rates and valuation matters for the Commonwealth and Southern Corp., and its subsidiary companies.

For two years he was chairman of the Rate Structure Committee of the American Gas Association and is still an active member of this committee. He has served as president of the Michigan Gas Association and is now chairman of the Rate Research Committee of the Edison Electric Institute.

Kansas Power and Light Co. Consolidating its Properties

To simplify its corporate structure the Kansas Power and Light Co., Salina, Kan., has moved to acquire the assets of its subsidiaries, the United Power and Light Corp. of Kansas and the McPherson Gas Co, and the properties of Public Service Co. of Kansas and the Peoples Ice and Fuel Co., the latter two being subsidiaries of North American Light and Power Co., a parent company. A new issue of $30,000,000 of 4½ per cent first mortgage bonds, due in 1965, is being offered to cover financing involved in the above consolidation.

Northern Natural Heating Sales Climb

Distributing companies served by Northern Natural Gas Co., Omaha, Neb., sold 5,249 heating installations between May 1 and November 1. Up to the first of September, 1,759 had been sold; sales during September brought the total to 3,557; and October sales produced another 1,692 installations.

New Well Extends Tracy Field

Amerada Corp. early last month completed its F. D. L. No. 3 well in the Tracy gas field in San Joaquin Valley, Calif. The new well tested 65 million cu. ft. daily capacity at a shut in pressure of 1,650 pounds. This well extends the proven Tracy area about 2 miles northward.

MARCH TO *LEADERSHIP* WITH GAS REFRIGERATION IN 1936

USES NO WATER

Here are three powerful allies: (1) An acceptance of gas refrigeration that is continually mounting, (2) a gas refrigerator that's more sales-inviting than ever, (3) the advertising support of the greatest campaign in gas refrigeration history.

1936 is *not* just another year for those companies that are planning to make gas refrigeration the spearhead of their sales and merchandising programs. It is a year of unparalleled opportunity.

We, of Electrolux, recognize with a deep sense of gratitude the splendid work the gas industry has done and is doing to promote the acceptance of gas refrigeration throughout America. During the past nine years, each year has seen a wider and more enthusiastic public response to gas refrigeration . . . each year, a larger percentage of all refrigerator sales in this country have been *gas* refrigerator sales.

Yet, to achieve the promise which 1936 holds for gas refrigeration, the activities of each *individual* gas company must be accelerated. Worthy of emulation as well as praise, are those gas companies which through aggressive effort last year put the gas refrigerator in *first place* for popularity and sales in their territory.

Today, the impetus of an ever-increasing acceptance of gas refrigeration—plus the sales advantages of an even more beautiful Electrolux and the support of powerful national advertising—offer you a not-to-be-missed opportunity. March to Leadership with Gas Refrigeration in *your* community during 1936.

New Air-Cooled **ELECTROLUX**
THE SERVEL *Gas Refrigerator*

TURN TO THE NEXT FOUR PAGES FOR THE WHOLE STORY OF THE NEW 1936 GAS REFRIGERATOR AND THE ADVERTISING CAMPAIGN BEHIND IT

NOW *an* ELECTROLUX

SIMPLIFIED . . . ORGANIZED . . . BEAUTIFIED

Neither time, money nor effort has been spared to make the interior of Electrolux as attractive and sales-inviting as the exterior.

Handles and trim are of gleaming Bakelite. Tray fronts, too, have been given a beauty treatment . . . provide smart contrast with their satiny finish.

And the new 1936 Electrolux has been simplified and organized throughout. There's a place for everything, but nothing to interfere with the free circulation of air.

On the opposite page are shown five of the many new and improved features in the 1936 Electrolux.

as beautiful inside as outside

The 1936 model matches the famous Electrolux beauty of cabinet design with a new eye-appealing, buy-appealing interior

ELECTROLUX for 1936 enables you to offer your customers a gas refrigerator that has been *proved* by the past . . . a gas refrigerator that has been *improved* for the future.

You have only to open the door of the beautiful new model to realize how much has been done to make the Electrolux refrigerator which received such overwhelming acceptance in 1935 *still better* for the new year.

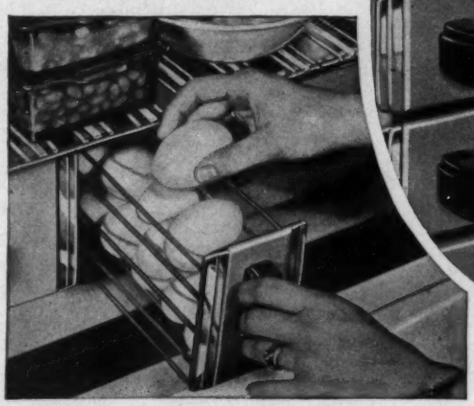
The whole interior has been simplified . . . organized . . . beautified. It's trim and efficient. There's plenty of snap, dash, eye-appeal. The new 1936 Electrolux has the kind of interior every woman wants. It offers *every convenience*, but no dirt-trapping, time-wasting knick-knacks.

Women will delight in the orderly, well-arranged shelves and handy basket-type drawers and racks in Electrolux that lighten kitchen work and bring more leisure hours. And they'll be glad to note how only an occasional rub with a damp cloth will keep it spotless and sanitary . . . keep it glistening and beautiful.

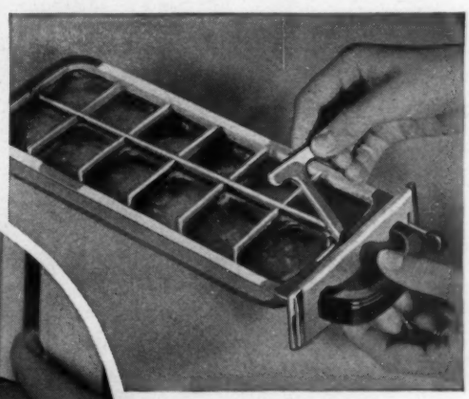
All this means sales—extra sales—for gas refrigeration. And it means valuable assistance for you in your March to Leadership with Gas Refrigeration in 1936!

New drawer-type vegetable freshener

Attractive egg rack (on 2 models)

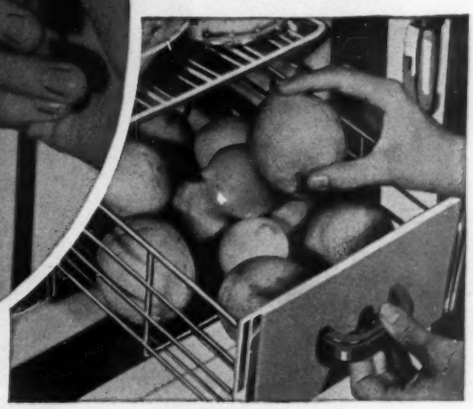


Smart Bakelite handles and trim



Sturdier, handier ice cube release

Convenient fruit and bottle drawer



And supporting your refrigeration sales activity in 1936...

THIS GREATEST ADVERTISING CAMPAIGN IN ELECTROLUX HISTORY

***More* Magazines . . . *More* Pages . . . *More* Readers! This year, Electrolux advertising will carry the dramatic story of gas refrigeration to more than 17,000,000 American families monthly, as well as to the country's leading builders, architects and real estate operators.**

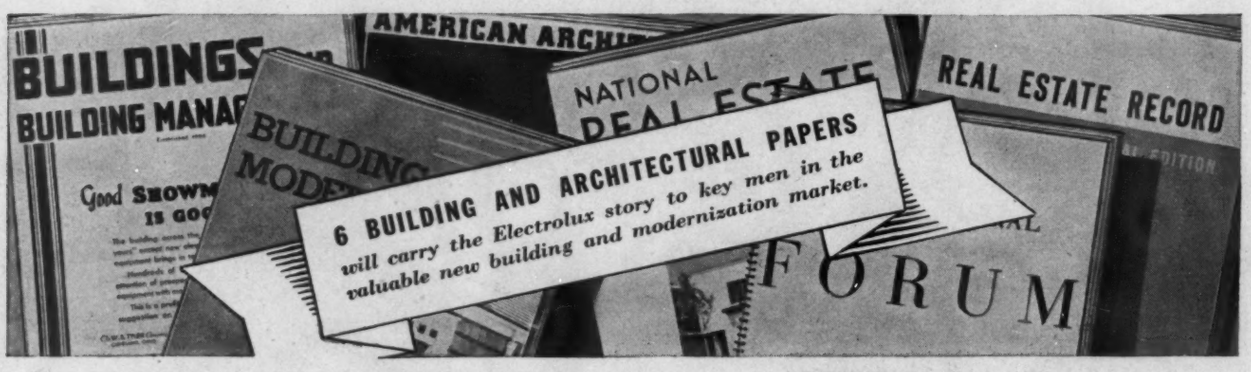
NINE POWERFUL national magazines—each a home favorite, each reaching a valuable market for Electrolux—will be used this year in the greatest advertising campaign ever run on gas refrigeration.

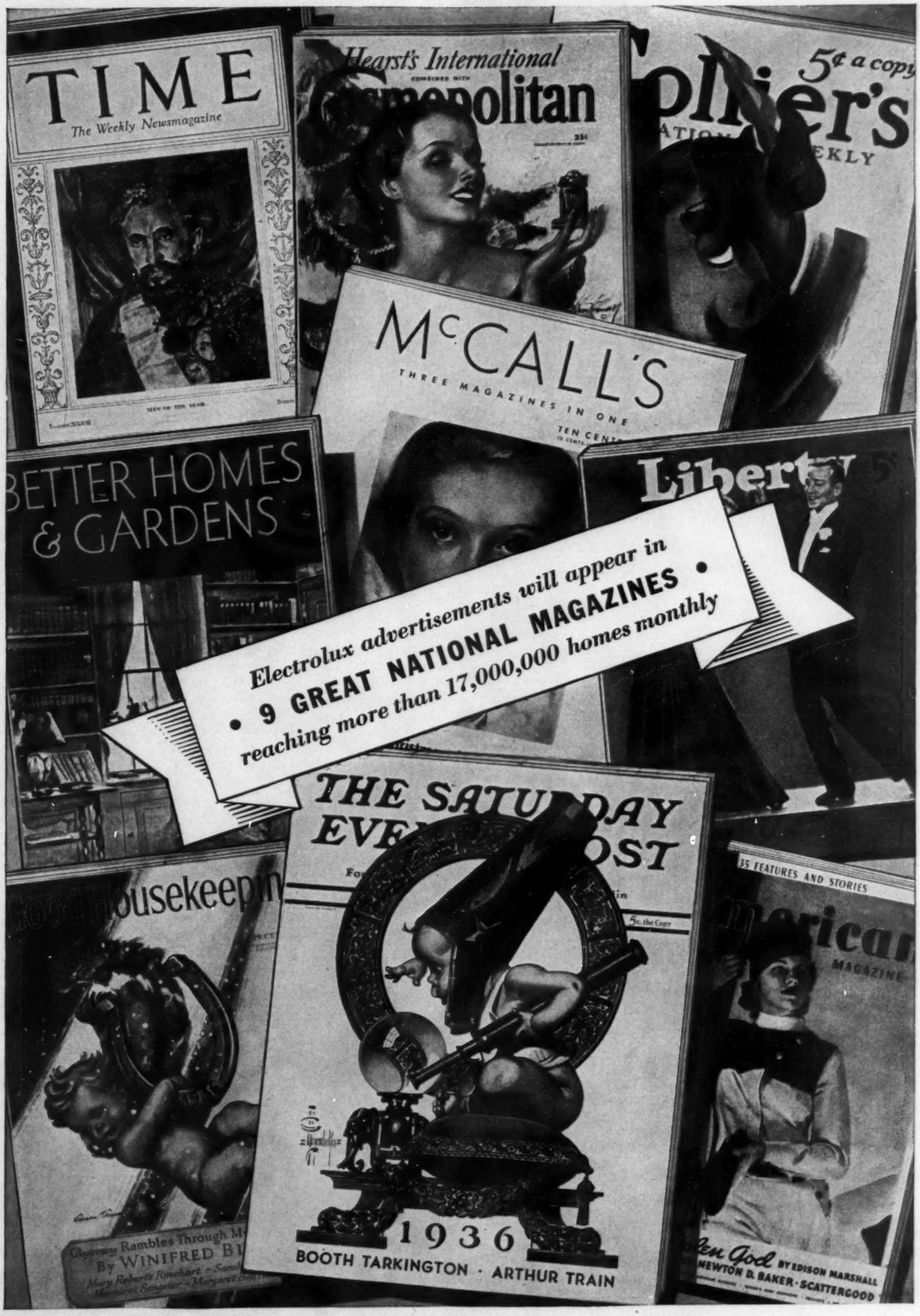
The complete list includes The Saturday Evening Post, Collier's and Liberty—three major national weeklies; Good Housekeeping and Better Homes & Gardens—leaders in the home service field; McCall's Magazine—a big favorite with women; the influential news weekly—Time; and the two prominent fiction monthlies—Cosmopolitan and the American Magazine.

Together, these magazines go into more than 17,000,000 American homes. They insure a nation-wide audience of families in *all* the worthwhile income brackets . . . an audience which includes the *whole* family, husband as well as wife.

And, in addition to the great home magazines, Electrolux advertising will be carried this year in six outstanding building and architectural publications. Today, building construction and modernization work is definitely increasing. And the Electrolux advertisements in these publications will assist you in presenting the facts about gas refrigeration to the owners, builders, architects, management and real estate operators—in fact, to everyone who has anything to do with wholesale operations and new development work—in your community.

In your March to Leadership with Gas Refrigeration in 1936, this aggressive Electrolux advertising program will provide an important supplement to your own vigorous gas refrigeration sales activities.




TIME
The Weekly Newsmagazine
Hearst's International
Cosmopolitan
5¢ a copy
McCALL'S
THREE MAGAZINES IN ONE
BETTER HOMES & GARDENS
Liberty
Electrolux advertisements will appear in
• 9 GREAT NATIONAL MAGAZINES •
reaching more than 17,000,000 homes monthly
THE SATURDAY EVENING POST
1936
BOOTH TARKINGTON · ARTHUR TRAIN
35 FEATURES AND STORIES
MAGAZINE
BY EDISON MARSHALL
NEWTON D. BAKER · SCATTERGOOD

Penn. State College Extension Course on Natural Gas Nears Completion

THE three year extension course, being offered on Petroleum and Natural Gas by the Pennsylvania State College at Pittsburgh, will be completed at the end of the current term and diplomas will be awarded.

Local gas men, largely from the Equitable Gas Co. and Manufacturer's Light & Heat Co., constitute this year's lecturers in the course, covering the following subjects:

1. History and Growth of Natural Gas Industry: Early discoveries of natural gas. Expansion of the industry. Expansion of utilization. Present national importance.
2. General Geology of Natural Gas: Gas producing areas in the United States. Theories of origin and accumulation. Gas sands and nature of production in Appalachian area.
3. Geology Continued: Methods used in locating wells. Calculation of reserves. Future possibilities of new fields and of deeper production in known fields.
4. Drilling: Rig and equipment used in cable tool drilling.
5. Drilling Continued: Completion of wells. Casing and tubing. Cementing. Use of packers. Fishing jobs.
6. Well Records: Drilling logs. Calculation of open flow. Rock pressure tests. Minute pressure tests. Total recovery estimates.
7. Operation and Maintenance of Wells: Control of pressures. Pressure reduction. Water problems. Bailing, swabbing, and cleaning out. Re-casing and re-tubing.
8. Public Service Commission Rulings: Rules affecting drilling, operation, maintenance and abandonment of gas wells.
9. Land Activities: Selection and acquisition of land. Leasing, purchasing, gas rights, etc. Rentals, royalties, and other monetary considerations. Definitions of terms used. Purchase of gas produced by others.
10. Terms and Units: Explanation and definitions of terms used in industry. Pressure units and methods of conversion.
11. Physical Properties of Natural Gas: Density, gravity, etc., and their determination. Charles Law, Boyles Law, Avagadros Hypothesis, Daltons Law, etc., and their application to every-day problems of the industry.
12. Gas Measurement: Meters and measurement applied to small valumes of gas. Inspection, repair, and proof of small volume (domestic) meters, Public Service Commission regulations concerning meters and measurement.
13. Gas Measurement Continued: Meters and measurement applied to large volumes of gas. Orifice and other large capacity meters. Public Service Commission regulations.
14. Transmission of Natural Gas: Theories of gas flow. Flow formulae and their derivations. Comparison of formulae. Their practical application.
15. Transmission Continued: Determination of line sizes. Kinds of transmission systems. Operation of system. Economic factors in transmission.
16. Compression of Natural Gas: Theories of compression. Adiabatic, isothermal, exponential compression. Determination of capacities and horse powers. Volumetric efficiencies. Mean effective pressures.
17. Compression Continued: Mechanics of compression. Types of compressors. Motive power. Fuel. Valves, cylinders, bearings, etc.
18. Pipe: Kinds of pipe. Types of joints. Economic limiting factors in choice of pipe.
19. Pipe Lines: The laying of lines. Equipment used. Connection of lines. Repairs and replacements.
20. Detection and Prevention of Leaks: Methods of testing. Electroylsis and corrosion.
21. Pipe Protection: Soil analyses. Pipe coverings. Economic factors affecting application of coatings.
22. Pressure Regulation: Types of regulators. High, low, and back pressure regulators. Large and small capacities. Regulator installations.
23. Distribution of Natural Gas: Types of systems. Design of systems. Calculations used in line extensions. Public Service Commission rules.
24. Distribution Continued: Operation of system. Public Service Commission regulations. Service and safety practices.
25. Utilization of Natural Gas: Industrial sales and service.
26. Utilization Continued: Domestic sales and service.
27. Integration of Entire Property: Operation of whole system from the Pressure Office. (As applied in particular to Equitable Gas Company.)
28. Industrial Relations: Relationship existing between employees and the Company.
29. Economics of the Natural Gas Industry: Factors influencing present and future of the industry.
30. Taxation and Depletion.

Each main heading indicates the subject to be covered in one class meeting.

Attendance at the school, which meets once a week, is made up mainly of employees and executives of Equitable Gas Co. and Manufacturer's Light & Heat Co. The fee for the course is $2.00 per year.

Oklahoma Natural Sells 27,988 Gas Appliances in 1935

OKLAHOMA Natural Gas Co., which serves Oklahoma City, Tulsa, Ardmore, Chandler, Enid, Muskogee, Okmulgee and Shawnee in Oklahoma, sold $18.07 worth of gas appliances per consumer in 1935, according to word from T. E. Bartlett of Oklahoma Natural. This figure is based on the sale of a total of 37,988 gas appliances of all kinds in a field of 124,904 residential and commercial meters. As of December 31, 1935, the company had a net gain of 4,051 meters.

Iowa Sales and Distribution Men Hold January Meeting

About 250 men attended the Sales and Distribution School of the Iowa Public Utilities Association held in Dubuque, Iowa, January 20 and 21, according to word from Chas. H. Dauchy, secretary-treasurer of the Association. Among the papers presented were an address on Federal utility legislation by Dr. Hugh S. Magill, president of the American Federation of Investors; "Municipal Ownership in Iowa", by P. A. Stover, Central States Electric Co.; and "Employee Cooperation in Load Building, C. A. Nash, vice-president in charge of sales promotion of the United Light and Power Engineering and Construction Co.

James F. Pollard Elected President of Seattle Gas Co.

JAMES F. POLLARD, for the past several years vice-president and general manager of the Seattle Gas Co., has been elected president of the company, effective January 1, 1936, succeeding Franklin T. Griffith.

JAMES F. POLLARD

Mr. Pollard is vice-president of the Pacific Coast Gas Association for the current year, and has served on many of the Association's committees.

Mr. Pollard was born in Missouri in 1889, attended grammar school in Kansas City, high school in Los Angeles, and was graduated from the University of California in 1912 with a degree of Bachelor of Science in electrical engineering. Following graduation he was employed for three years in construction work on a hydro-electric project of the Pacific Gas and Electric Co.

During the following three years Mr. Pollard was assistant engineer in the gas and electric division of the California Railroad Commission. For the two years following he was commercial manager and assistant to the president of the Sierra and San Francisco Power Co. and the Coast Valleys Gas and Electric Co. in northern California.

On January 1, 1920, he became general manager of Coast Valleys Gas and Electric Co., was later elected vice-president and general manager and served the utility in these capacities for a period of 10 years. He continued in this capacity after the acquisition of the property by Pacific Gas and Electric. In September 1929 he was transferred to the general office of P. G. and E. as assistant to the vice-president and executive engineer. Mr. Pollard resigned from this post December 31, 1930, to accept the general managership of the Seattle Gas Co., and in 1932 was elected vice-president.

Federal Credit Union Formed by Portland Employees

A Federal credit union has recently been organized by employees of the Portland (Ore.) Gas & Coke Co. for the purpose of pooling the savings of its members to build a fund that will be available for loans to members.

Officers of the Portland Gas & Coke organization are R. R. Wood, president; E. I. Hopper, vice-president, and R. D. Cole, treasurer.

100 P. G. and E. Representatives Taking Sales Course

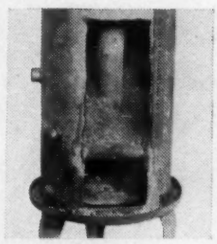
One hundred Pacific Gas and Electric Co., San Francisco, salesmen are enrolled in a course on salesmanship conducted by R. A. Balzari, formerly of California and more recently of New York. Last year six company salesmen took the course, and it was decided to arrange for 100 scholarships for the current year. A number of employees of other departments have enrolled for the course also.

. . . and *constant gas consumption* when the tank is made of *non-rust* Everdur

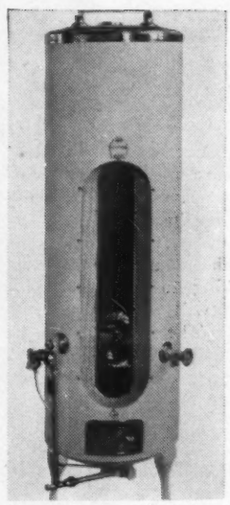
Why should you sell or encourage the sale of water heaters equipped with tanks in which rust will form... to discolor the water, reduce efficiency, and in time cause the tank itself to fail? In many sections of the country this happens all too often, resulting in consumer dissatisfaction, increased servicing expense, and an interrupted sale of gas.

A tank of Everdur Metal assures a dependable source of rust-free hot water... not for just a few years, but *indefinitely.* For Everdur, an unusual alloy composed principally of copper, is as strong and easily welded as steel, and lends itself to economical, virtually "one-piece" tank construction. It *cannot* rust!

These features appeal to homeowners. For most people will pay a little more to get much greater value. These same features explain why leading heater manufacturers equip rust-proof models with tanks of strong, *rustless* Everdur.



After less than one year's use, six inches of mineral deposits had settled in this tank, making its operation expensive and hazardous. To cope with such situations, CROWN Model "A" heater is built with a hand hole clean-out.



Cut-away view of CROWN Model "A" automatic gas water heater, made by Crown Water Heater Co., Los Angeles. Special features include a hand hole clean-out and an all-welded tank of *non-rust* Everdur Metal.

EVERDUR METAL
"Everdur" is a registered trade-mark identifying products of The American Brass Company made from alloys of copper, silicon and other elements.

THE AMERICAN BRASS COMPANY
General Offices: Waterbury, Connecticut
Offices and Agencies in Principal Cities

ANACONDA
American Brass
3558

EVERDUR METAL *for* TANKS

"Fastest Cook in South" Theme of S. G. A. Contest

THE Southern Gas Association is sponsoring a "Breakfast in Six Minutes" contest, the winner to be acclaimed "Mrs. Fastest Cook in the South". The idea was originated by William E. Leverette, commercial manager of Nashville (Tenn.) Gas and Heating Co., as the result of cooking speed tests which he conducted using a gas range and stoves utilizing electricity and other competitive fuels. A complete breakfast was prepared in 6 minutes and 20 seconds with gas, whereas 12 minutes and 25 seconds were required to prepare the same breakfast with the fastest of the other fuels.

The contest set-up, as given in an item in the January issue of the "Roper Ranger", house organ of the Geo. D. Roper Corp., proposes the following plan: The contest will be announced in newspaper advertisements in 20 Southern cities, with each gas company to schedule 350 inches of space. A total of $4,750 in prizes will be offered to consist of grand prizes of $500 and $250; 20 local prizes of a $125 gas range each; and 20 local prizes of a trip to New Orleans for the final contest in competition for the grand prize and title of "Mrs. Fastest Cook in the South". The expense to each cooperating gas company will be the price of the prize gas range, a $40 contribution toward the grand prize, $75 dollars for the winner's trip to New Orleans, and the cost of the advertising.

The Nashville Gas and Heating Co. conducted a contest in its auditorium recently. Ten housewives were lined up at a battery of 10 gas ranges. When the signal to start was given, each one lighted the range, fried six eggs, six slices of bacon, made six pieces of toast and enough coffee for four cups. The contestants were clocked with stop watches and the winner's breakfast was judged as to edibility. If the result was unsatisfactory, the next fastest was declared winner. For several days trials for different groups were held at intervals of 30 minutes, and the winners competed against each other until the champion eliminated all comers.

Each contestant was required to bring her own breakfast materials and the company provided range and utensils.

Mr. Leverette is chairman of the Southern Gas Association contest committee and will present a paper entitled "Mrs. Fastest Cook in the South" at the S. G. A. Convention on February 21.

Texas State College for Women Is Large Gas User

THE Texas State College for Women at Denton, largest women's college in the world, and on the lines of Community Natural Gas Co., Lone Star subsidiary, is gas-equipped throughout. In the college central power plant a 168 kilowatt generator driven by a 250 h.p. natural gas engine, provides lighting for the entire institution and power for a rotary press for printing the college paper. The central plant operates 18 hours a day and includes a 1200 h.p. boiler which supplies steam and hot water for three dormitory kitchens, the college laundry, heating systems in 10 campus buildings and for a circulating system in the college greenhouses where the temperature is constantly maintained at 70° F. during the winter.

The Community Natural Gas Co. is now making further installations on the campus that will approximately double the present load. The new installations include 250 space heaters, 12 heavy duty ranges, 11 large water heaters, a gas-fired steam boiler for the college's new hospital and 10 forced air unit heaters. There will be 400 gas steam radiators installed in new buildings now under construction.

Natural gas is used in the college jewelry laboratory for melting soldering metals, in the chemistry and physics laboratories, in the pottery department, in the pressroom for linotype machines and stereotype melting pots. Incubators and sterilizers in the bacteriological department are fired with natural gas as are the wax melting pots used in batik work. The household arts department includes an all-gas model kitchen.

Water for the college's 70,000-gallon swimming tank is heated with gas. The boss oven in the bakery, with a capacity of 3,000 rolls or 178 two-pound pullman loaves, is gas-fired. In the adjoining kitchen, burners are lighted in September and remain lighted for the entire school year except for the Christmas holidays.

"Spread-The-News" Water Heater Campaign Launched

KNOWN as the "Spread-The-News" sales campaign, a special activity on water heaters is under way by the Southern California Gas Co., Southern Counties Gas Co., and Los Angeles Gas and Electric Corp. It opened on January 13 and extends to February 29.

Water heaters meeting the qualifications for long-term financing set up by these companies last year (see *Western Gas* for April, 1935) will be sold during the campaign for no down payment other than the California state sales tax. Under some conditions contracts will be extended as long as 40 months on galvanized tank automatics. Dealers contracts will be purchased on the above basis, and numerous other inducements are being offered to secure maximum dealer tie-in.

A special advertising plan is open to dealers selling automatic gas water heaters during the campaign, the gas companies offering to refund one-third of the dealer's advertising on tie-in copy up to $50 expenditure, and one-half on amounts above $50. An additional 15 per cent rebate is offered on advertisements of an Everdur tank heater. Copy and other details are subject to the companies' approval. This cost-sharing offer does not apply to the Los Angeles metropolitan area.

Extensive newspaper advertising by the companies, and window banners, truck cards, etc., available for use by companies and dealers, are also being placed behind the campaign. Special "Spread-The-News" bulletins are going to dealers at frequent intervals.

With somewhat different details, each company is stimulating its own sales staffs and its dealers to tie into the water heater effort. Southern California Gas Co., for example, is setting up 10 cash prizes for each of its contest divisions outside the Los Angeles area, and also system-wide cash prizes for its dealers. Los Angeles dealers will be included in a special contest with dealers of the L. A. G. and E.

Another cash prize is offered the dealer contact representative who sets up the best record during the contest. Suitable cash prizes are available for salesmen in each division, and all salesmen to be eligible to a prize must score at least 700 points. Non-sales employees are engaged in a prospect contest, with cash prizes in each division, and must score a minimum of 300 points to be eligible for prizes.

Sales accomplishment is being measured by the Southern California Gas Co. for the contest on the following point system:

Automatic Storage Tank Water Heaters: 5 points for each gallon of capacity (manufacturer's rating, not nominal) plus 1 point for each dollar of established retail installed sales price.

Instantaneous Water Heaters: 30 points for each gallon per minute capacity (manufacturer's rating) plus 1 point for each dollar of established retail installed sales price.

"Booster" Heaters Sold for Domestic Use: 3 points for each gallon of recovery per hour (manufacturer's rating) plus 1 point for each dollar of established retail installed sales price of the heater only.

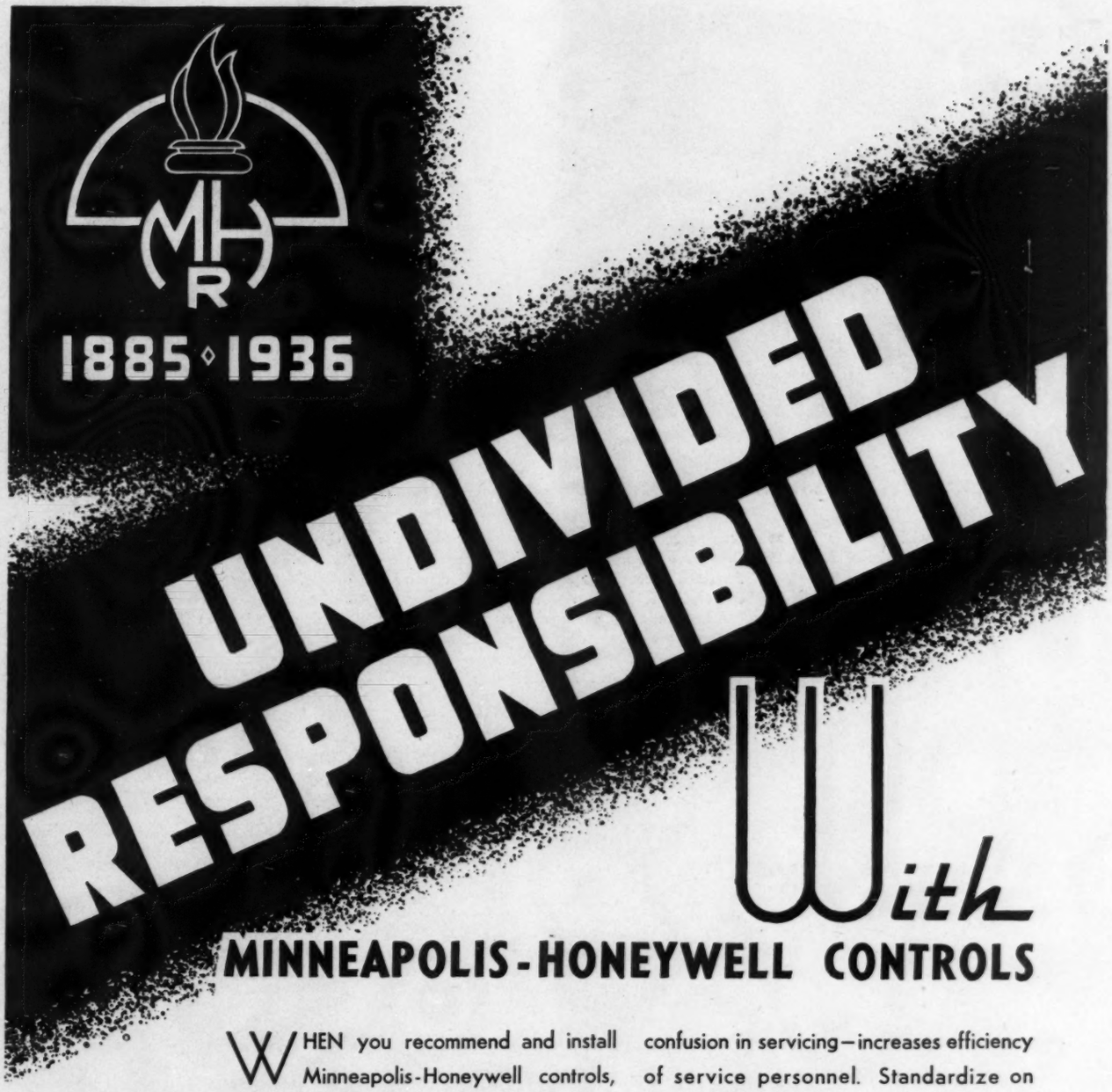
In addition, in each case where an active electric water heater is replaced by a qualified automatic gas water heater, the dealer will be awarded a bonus of 100 points.

All automatic water heaters accepted for purchase of dealer contracts must sell retail at not less than $50 installed, or uninstalled at not less than $42.50.

Chicago District Pipe Line Co. Rates Reduced

AS THE result of a modification early last month of the contract for delivery of natural gas to the Chicago area, involving the Chicago District Pipe Line Co., Peoples Gas Light and Coke Co., Public Service Co. of Northern Illinois and Western United Gas and Electric Co., substantial savings to the three distributing companies will result. Peoples Gas Light and Coke alone will benefit to the extent of some $1,000,000 annually, according to George A. Ranney, vice-chairman of Peoples Gas Light and Coke. The original contract was made in 1931 and became effective January 1, 1935.

Chicago District Pipe Line Co., takes its supply at Joliet, Ill., from the transmission line of the Natural Gas Pipe Line Co. of America, originating in the Texas Panhandle, and delivers to the three companies.



WHEN you recommend and install Minneapolis-Honeywell controls, you can rest assured you have given your gas burners every opportunity to function at their best. Use of complete Minneapolis-Honeywell control equipment means that the responsibility for proper and accurate control rests squarely upon the shoulders of the oldest and largest manufacturers of automatic controls in the world — simplifies stock keeping — reduces inventory — avoids confusion in servicing — increases efficiency of service personnel. Standardize on Minneapolis-Honeywell, you'll find it pays. Dependable controls cost less than service. Minneapolis-Honeywell Regulator Co., 401 East 28th Street, Minneapolis, Minn.

■

Branch and distributing offices in all principal cities . . . In Canada: Minneapolis-Honeywell Regulator Co., Ltd., 117 Peter Street, Toronto. European sales and service: 233 Heerengracht, Amsterdam, Holland.

MINNEAPOLIS-HONEYWELL

Control Systems

BROWN INSTRUMENTS FOR INDICATING, RECORDING AND CONTROLLING

Oklahoma Executive's Christmas Tree Natural Gas-Fired

A CHRISTMAS tree which "blew in" at the home of George Frederickson, 1604 Camden Way, Nichols Hills, Oklahoma City, is the newest oddity in Yuletide decorations.

According to word from Thos. E. Bartlett, of Oklahoma Natural, the tree, constructed of green painted iron pipe, consists of a "trunk" and approximately 50 "branches" from which natural gas spurts to form the illusion of a candle-lighted Christmas tree. Asbestos decorations and sparkling ornaments complete the illusion.

Thousands of persons viewed the unique tree, whose light was visible for some distance. Mr. Frederickson is vice-president of Oklahoma Natural at Oklahoma City.

Program for Mid-West Regional Gas Sales Conference

THE A. G. A. Mid-West Regional Gas Sales Conference will be opened February 13 at Hotel Sherman, Chicago, by H. J. Dropp, of Milwaukee Gas Light Co., chairman of the Mid-West Regional Gas Sales Council. The keynote address will be presented by Gael Sullivan of Chicago, associate director of Federal Housing. The conference program is as follows:

February 13, Morning

Trends in Time Payment Selling—Delbert J. Dunsan, Professor of Marketing and Management, School of Commerce, Northwestern University, Chicago, Ill.

Afternoon

Presiding: J. Frank Jones, Battle Creek Gas Co., Battle Creek, Mich.

The Key Campaign for Modern Gas Range Sales—E. R. Guyer, Domestic Range Committee, A. G. A., Chicago, Ill.

What the First Range Contest Accomplished for Two Companies—A. L. McKinstry, Cedar Rapids Gas Co., Cedar Rapids, Iowa; Charles R. Henderson, Washtenaw Gas Co., Ann Arbor, Mich.

February 14, Morning

Presiding: Newell E. Loomis, Detroit City Gas Co., Detroit, Mich.

Arousing a Slumbering Water Heater Market—R. J. Canniff, vice-chairman Water Heating Committee, A. G. A., Pittsburgh, Pa.

Developments in Rental Purchase Plans—E. M. Rosenkrans, The Gas Service Co., Kansas City, Mo.; H. S. Oyen, Central Illinois Electric & Gas Co., Rockford, Ill.

Straight Selling Plans—K. F. Dickinson, Public Service Co. of Indiana, Lafayette, Ind.

Afternoon

Presiding: C. A. Nash, United Light & Power Co., Davenport, Iowa.

Establishing Leadership for Gas Refrigeration in 1936—B. H. Gardner, chairman Refrigeration Committee, A. G. A., Columbus, Ohio.

Gas Refrigeration—Prizes and Profits for 1936—K. W. Browne, Milwaukee Gas Light Co., Milwaukee, Wis.

Mid-West House Heating Progress During 1935—Bernard T. Franck, American Light & Traction Co., Chicago, Ill.

Morning

February 15, Home Service Session

Presiding: Irene Hickey, Detroit City Gas Co., Detroit, Mich.

Home Service Curriculum in College—Dr. Louise Peet, Iowa State College, Ames, Iowa.

Operation of the Modern Gas Range—Dorothy Shank, American Stove Co., Cleveland, Ohio.

Gas Refrigeration—Jane Wagner, Electrolux Refrigerator Sales, Inc., New York, N. Y.

Home Service Aids in the Water Heater Campaign—R. J. Canniff, vice-chairman, Domestic Range Committee, A. G. A., Pittsburgh, Pa.

New Aircraft Plant Utilizes Gas

The new million dollar aircraft plant of the Consolidated Aircraft Corp., recently completed at Lindbergh Field, San Diego, Calif., utilizes natural gas, supplied by San Diego Consolidated Gas and Electric Co., as a basic fuel for all heating needs. The maximum hourly load requirement for the plant is 10,000 cu. ft.

Back Pressure Data on Gas Wells Report Published

A REPORT on back pressure data on natural gas wells and their application to production practices has been published as the result of a cooperative study by the United States Bureau of Mines and the Natural Gas Department of the American Gas Association.

The report covers a practical method of gauging gas well deliveries under any pressure conditions, including open flow, without opening the wells wide to the atmosphere. It also includes a comprehensive study of the application of back pressure data to production practices.

The study was begun in January, 1929, when the problem was assigned to the subcommittee on gauging gas well deliveries, under the chairmanship of N. C. McGowen. The method devised is based upon the use of back pressure data.

The report contains numerous data on representative gas wells in different areas throughout the United States which were obtained by carefully conducted tests. These data, together with all available information, have been analyzed to secure practical methods of gauging gas well deliveries and to determine how back-pressure data can be applied to production practices.

The report is available to the industry in code form and may be secured either through the Natural Gas Department office at Dallas or through Headquarters of the American Gas Association at 420 Lexington Ave., New York City. The price has been set at 50c per copy; one to 24 copies at 40c each; all over 25 copies at 30c each.

Missouri Commission Denied Jurisdiction Over Cities Service Pipe Line

THE United States Supreme Court in Washington, January 6, refused to consider the appeal of the State of Missouri from the decision of the supreme court of Missouri holding that the public service commission had no jurisdiction over natural gas brought into the state by the Cities Service Gas Company.

The Missouri commission had held that in sales of industrial gas the Kansas City Gas Company and other distributing companies acted as agent for the pipe line company and for that reason ordered the pipe line company to file schedules of rates. The Missouri supreme court set aside this contention, holding that there was no evidence of agency and that the commission could not require the filing of such rate schedules.

The decision of the United States Supreme Court in refusing to review the case makes the decision of the Missouri supreme court final and ends the litigation.

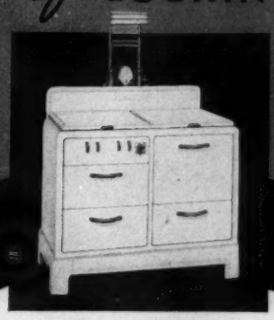
Long Beach Contracts with Industrial Fuel Supply Co.

Long Beach, Calif., late in December entered into a contract with the Industrial Fuel Supply Co. for supplying natural gas to its municipal distribution system for a period of two years. Terms of the contract call for a rate of 20 cents per M c.f. for domestic and commercial consumption and 11 cents per M c.f. for industrial consumption.

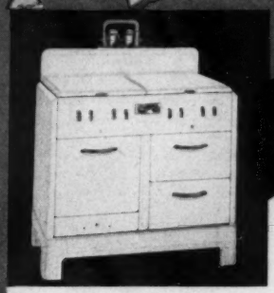
UNIVERSAL GAS RANGES

Promote the highest standard of COOKING PERFORMANCE

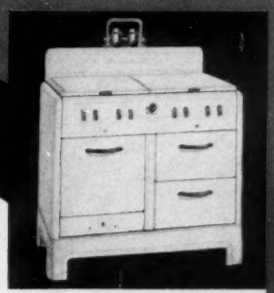
8 NEW SERIES FOR 1936



OXFORD UNIVERSAL
Custom Four Burner—18 Inch Oven—Table Top Gas Range



MEDFORD UNIVERSAL
De Luxe Six Burner—Double Oven—Table Top Gas Range



MANCHESTER UNIVERSAL
De Luxe Six Burner—Elevated Broiler—16 Inch Oven—Table Top Gas Range

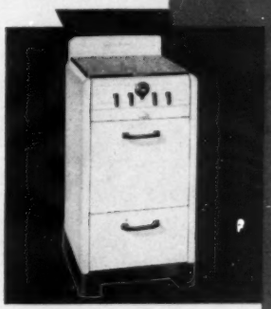
THERE can be no truer indication of the actual merit of any product than the buying response accorded it. In 1935 unit production of Universal Gas Ranges showed an 80% increase over 1934—incidentally, the volume of Universal Gas Ranges produced in 1935 was greater than any year in Cribben & Sexton's history.

There are definite reasons why Universal is rapidly forging to the front as America's outstanding gas range manufacturer.

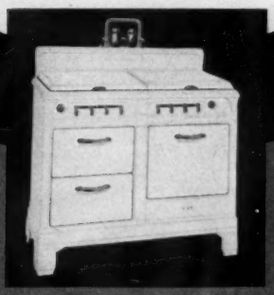
Universal Gas Ranges are designed primarily to appeal to utility customers as they not only promote the highest standard of cooking performance, but are gas ranges that actually protect the domestic gas cooking load.

Again in 1936—Universal has produced an entirely new line, improved in styling—in service performance—in efficiency of operation—and in convenience of use.

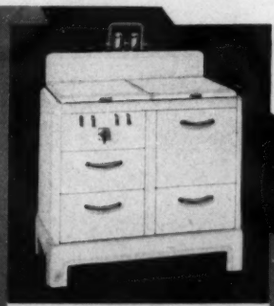
BRISTOL UNIVERSAL
Four Burner—16 Inch Oven—Table Top Gas Range



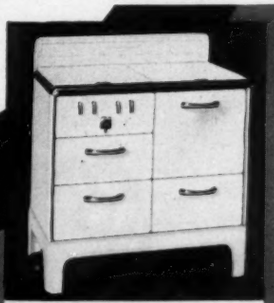
GOTHAM UNIVERSAL
Four Burner—16 Inch Oven—Kitchenette Gas Range



STRAND UNIVERSAL
Custom Six Burner—Double Oven—Table Top Gas Range



MARLBORO UNIVERSAL
De Luxe Four Burner—16 Inch Oven—Table Top Gas Range



WHITEHALL UNIVERSAL
Standard Four Burner—16 Inch Oven—Table Top Gas Range

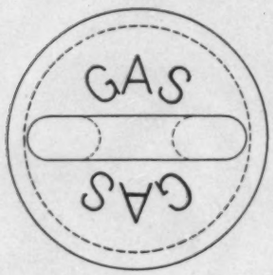
UNIVERSAL *Gas Ranges*

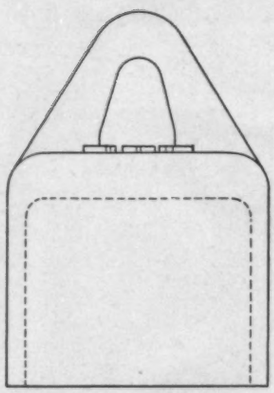
MANUFACTURED BY CRIBBEN & SEXTON COMPANY, 700 N. SACRAMENTO BLVD., CHICAGO, ILLINOIS

Safety Cap Designed for Gas Valves

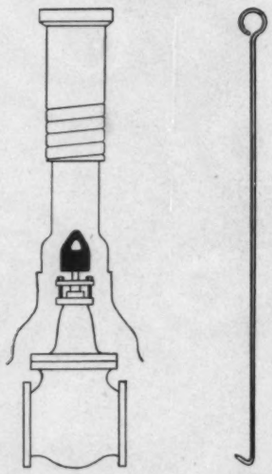
THROUGH the courtesy of Irwin H. Witt, assistant division operating foreman for the Public Service Co. of Northern Illinois, *Western Gas* passes along the following information on a safety cap for gas valves. Mr. Witt comments on the need for the device, and describes it as follows:

"All progressive gas companies are constantly on the alert for ways and means by which they may increase the safety with which they distribute their product. One of the hazards that must be continually guarded against is the possibility of interruptions in service to customers in those instances where the supply might be re-established before adequate precautions can be taken by the customer or the gas company's operating personnel. Two methods of attacking the problem have been followed—one by equipping the customers' appliances with automatic safety controls, and the other by designing the transmission and distribution system so as to minimize the possibility of unexpected interruptions at their source. It was with this latter thought in mind that the 'Gas Valve Safety Cap,' which is described below, was conceived.





Gas valve safety cap.



Safety cap installed on valve and hook for removing cap.

"The safety cap, which is made of cast iron, is of such size that when it is placed on the operating nut of a gas valve, it prevents the placing of a wrench or valve key on the nut until the valve safety cap is removed. Since 'GAS' is plainly cast on the cap and since it is designed in such a way that it requires the use of a special hook to remove it from the valve nut, the possibility of another utility or unauthorized person operating the valve by mistake, even in those cases where the valve box cover is missing or has been interchanged with that of another utility, is eliminated."

Second National Gas Range Contest Opens February 1

UNDER the chairmanship of R. J. Rutherford who heads the Domestic Range Committee for the American Gas Association's Commercial Section, the second national contest on gas range sales was put in motion on February 1, to run to July 31. The contest is jointly underwritten by the A. G. A. and a group of gas range and range accessories manufacturers.

Success of last year's campaign—first national contest on ranges—prompts the industry to renew this effort. Some 300 companies participated in the 1935 contest, which was a big factor in increasing the sale of heat controlled ranges 43 per cent over 1934. This increase has been maintained in sales since the close of the contest last June.

Organization of the campaign will follow in a general way the scheme of other national sales events. Competition will be run in six divisions, classified on a meter basis. Prizes will amount to $12,675 in all. They will provide 540 cash prizes of $10 each for individual salesmen, awarded each month of the contest. In addition there will be 90 prizes of $25 each for salesmen, for sales results over the six months of the contest.

In each of the six divisions there will be three company prizes for the best two-month sales results within the campaign period, these company prizes totalling $1,375 in all. Three company prizes in each division for six-month campaign results will also be available, totalling $2,600.

The best record in each division for sale of ranges with time clock control of the baking oven, over the six-month period, will bring another prize, this feature being allotted $525 for all divisions. Another prize contest will hinge on sales of ranges equipped with automatic oven lighting, also allotted $525 for awards. There will be but one company award in each division for these two special features.

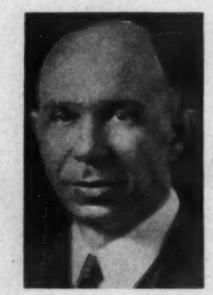
For campaign purposes sales results will be measured in cash retail dollar value of ranges sold. Company achievement will be related to the number of domestic meters served. As the contest is designed to stimulate dealer sales as well as company, the sales of cooperating dealers will go into the total for participating companies so long as they meet specifications set up for the campaign. Dealer salesmen also will be eligible for the individual prizes on the same footing as company salesmen.

Minimum specifications set up to cover the ranges sold under campaign provisions include A. G. A. approval, full enamel outside finish, oven heat control, fully insulated oven, automatic (or flash) top burner lighting—with additional requirements for certain of the prize competitions.

Rental or rental-purchase ranges will be evaluated at 75 per cent of the full sale rating for the campaign.

Registration closes at midnight of February 10. To enter, companies are required to pay modest registration fees which help to defray costs of the effort, these fees being slightly higher for non-member companies than for A. G. A. members.

Niesemann of Pittsburgh Equitable Returns from European Tour



F. NIESEMANN

F. NIESEMANN, of the research department of the Pittsburgh Equitable Meter Co., returned recently from an extensive tour of several European countries gathering data on their meter products and manufacturing methods, particularly in Germany. Several options have been obtained on a number of new meter developments which cover American patent rights.

Mr. Niesemann joined the staff of Pittsburgh Equitable in 1926, prior to which time he had been engaged in flow meter development and other industrial research in Germany.

Forster Sales Co. Opens Offices in Chicago

C. H. Miller, formerly manager for the Forster Mfg. Co., Ltd. of Berkeley, Calif., is now manager of a new firm known as the Forster Sales Co., which last month opened offices at 232 E. Erie St., Chicago, Ill.

The new company is acting as direct factory representative for Forster Mfg. Co., Ltd.; D. H. McCorkle Co., Berkeley, Calif.; and Chas. M. Bailey Co., Inc., San Francisco, Calif.

1936 prices
START AT THE BOTTOM

1936 quality
STAYS AT THE TOP . . .

RUUD
GAS WATER HEATERS

ALL MARKETS!

ALL GASES!

ALL CONDITIONS!

ALL PRICES!

RUUD has a gas water heater,—automatic and non-automatic, —for every type of home, institution and commercial building, all potential load producers.

RUUD is made to operate on all gases,—natural, manufactured, mixed and liquefied petroleum.

Special models are made for all conditions of operation.

Prices start at rock-bottom and graduate upward by easy steps according to the type and size. In all water heater classes, RUUD offers the most *value-per-dollar*.

Write for all details and your copy of new 1936 Advertising Portfolio

RUUD MANUFACTURING COMPANY-PITTSBURGH, PA.

H. R. Basford Company
665 Howard Street
San Francisco, California

J. H. Fagan Company
161 W. Wisconsin Avenue
Milwaukee, Wisconsin

Ruud Heater Company
911 S. Grand Avenue
Los Angeles, California

Ruud Manufacturing Company
820 Carondelet Street
New Orleans, Louisiana

Northwest Gas & Electric Eqpt. Co.
1201 Public Service Building
Portland, Oregon.

Ruud Water Heater Company
2018 Jackson Street
Dallas, Texas

William A. Flatt Company
1031 Santa Fe Drive
Denver, Colorado

Robt. Thompson
1903 Washington Ave.
St. Louis, Missouri

TRAVELING REPRESENTATIVES EVERYWHERE

Kitchen Planning Service as an Aid to Sales

(Continued from Page 16)

reau, which for lack of space is located on the third floor, recorded nearly 14,000 callers during the year, who with various problems in mind visited the Kitchen Planning offices.

Naturally every visitor to the Kitchen Planning Bureau is not a prospective appliance customer nor is every visitor about to build or modernize. But as a result of questioning, which is never objected to, the Bureau compiles a well informed file of future prospects not only for gas appliances but also for other units. This last information in due course will be referred to respective merchants, if agreeable to the client. By experience we find that a prospective buyer of cabinets or a sink is likely to become a buyer of gas appliances at the same time. Ensemble showing of kitchen equipment very often results in ensemble buying. In a modernization job the cost of a gas appliance is no great expenditure and often follows as a matter of course, even if not originally planned. It is the Bureau's duty to prove that the existing appliance is outmoded and ill-fitting in new surroundings and this is not a difficult task. That the Bureau locates additional outlets for gas and stimulates the sale of better appliances is another obvious duty.

It stands to reason that any service designed to profit both company and customer cannot be shallow or superficial. The Bureau is equipped to and does prepare actual working plans, complete with specifications and data. These are, of course, drawn and recommended by architects fully versed in building practices.

While telephone and mail inquiries are cheerfully answered particular efforts are made to encourage personal visits to the Bureau. The reason is obvious. Since it is the Bureau's function to impress, this can best be done by personal contact. If, on a visit, as is often the case, the caller desires photographs of the exhibit these are not given then but are sent one or two days later with a letter written in a friendly tenor. The small cost of this is justified since it is certain to make a good impression on the customer and furnish family conversation of advantage to us. Likewise when a visitor has informed us of her inclination to proceed on a modernization project and no developments occur, a follow-up letter is sent with an inquiry of the reason for the delay. Such follow-up is doubly important where the records show that the caller mentioned the need for a gas appliance but would commit herself to no purchase until the time of remodeling.

During 1935 nearly 200 kitchens were designed. Of these an encouraging number were for new homes. Most of these plans resulted in completed kitchens and stand as creditable evidence of the superiority of the gas kitchen. In nearly all instances one or more appliances were sold; in many cases it turned out to be an all gas home with gas for cooking, heating and refrigeration. It is important to bear in mind that no pronounced sales effort can be exerted since that would be injurious to the service standing of the Bureau, and that the sales were direct results of its service feature. With pleasant relations established between the customer and the company the accomplishment of a sale is not difficult if the need for the appliance has been convincingly presented.

It has been interesting to note that almost as many men as women consult with the Bureau, that repeat visits are frequent, and that word of mouth advertising is responsible for most visitors.

It is no surprise to find that women are deeply concerned about the ultimate effect from a decorative point while men are concerned with the expenditure to attain it. Requests for help in problems pertaining to decoration lead above all others and come to us in numbers over the telephone and by mail. This confirms my long time belief that the potency of color as a sales factor in this and other fields is not fully appreciated nor exploited. It is reasonable to suppose that a customer finding a satisfactory answer to a problem will turn with confidence to us again at the time of appliance purchase.

That kitchen planning is a service appreciated by architects and builders is testified to by the number consulting the Bureau knowing that help in planning, specifications and data can be had authoritively and without loss of time.

As building appears to be on the upgrade, far-reaching possibilities of this unique service-selling unfold—possibilities that warrant more emphasis on this branch of gas company activity.

Eastern Natural Gas Regional Sales Conference

THE Eastern Natural Gas Regional Sales Conference of the A. G. A. will be held February 6 to 8 at the William Penn Hotel, Pittsburgh, Pa. Geo. L. Scofield, chairman of the Eastern Natural Gas Regional Sales Council, will open the Conference on the morning of February 6. Following his remarks, C. E. Bennett, chairman of the A. G. A. Commercial Section, will present the keynote address. Presentation of papers will then proceed according to the following program:

Thursday, February 6, Morning

What's Ahead for Gas Water Heating—Chas. L. Yost, United American Bosch Corp., Pittsburgh, Pa.

The Need of and Prospects for National Advertising—Herman Russell, chairman, National Advertising Committee, A. G. A., Rochester, N. Y.

Afternoon

Presiding: W. L. Hutcheson, the Manufacturers Light & Heat Co., Pittsburgh, Pa.

A.G.A. National Sales Contests:

Arousing a Slumbering Water Heater Market — R. J. Canniff, Water Heating Committee, A. G. A., Pittsburgh, Pa.

The Key Campaign for Modern Gas Range Sales—F. S. Dewey, Domestic Range Committee, A. G. A., Cincinnati, Ohio.

New Methods of Selling Modern Cookery —Paul Dorsey, Cribben & Sexton Co., Chicago, Ill.

Establishing Leadership for Gas Refrigeration in 1936—B. H. Gardner, chairman, Refrigeration Committee, A. G. A., Columbus, Ohio.

Friday, February 7, Morning

Presiding: V. L. Black, Equitable Gas Co., Pittsburgh, Pa.

Home Insulation—J. H. McKay, Johns-Manville Corp., New York, N. Y.

Progress and Possibilities in Winter Air Conditioning—Geo. Boeddener, Fox Furance Co., Elyria, Ohio.

Commercial and Industrial Heating — George Mandel, Surface Combustion Corp., Toledo, Ohio.

Afternoon

Presiding: Geo. L. Scofield, Republic Light, Heat and Power Co., Inc., Buffalo, N. Y.

Experiences and Possibilities in Space Heating Sales—H. B. Yost, Hope Natural Gas Co., Clarksburg, W. Va.; Paul Dunn, Fayette County Gas Co., Uniontown, Pa.; J. G. Werner, Equitable Gas Co., Pittsburgh, Pa.; Frank D. Howell, Dominion Natural Gas Co., Ltd., Brantford, Ontario, Can.

Importance of Gas Refrigeration Sales to Natural Gas Companies—E. M. Tharp, Columbus Gas and Fuel Co., Columbus, Ohio.

Saturday, February 8, Morning, Home Service Session

Presiding: Hulda Ungericht, The Ohio Fuel Gas Co., Columbus, Ohio.

Home Service in the A. G. A. Sales Campaigns—Beatrice Cole Wagner, chairman, Home Service Committee, A. G. A., Philadelphia, Pa.

Home Service Aids in Water Heater Sales —K. M. Clark, Ruud Manufacturing Co., Pittsburgh, Pa.

Equipment Courses as Training for Home Service Work—Daisy Davis, Ohio State University, Columbus, Ohio.

Home Service Activities—Group Discussion.

Kansas City Gas Co. Adds to Sales Force

IN anticipation of increasing business in 1936, the Kansas City (Mo.) Gas Co. has added 10 salesmen to its new business department. The sales force formerly consisted of 30 men, working as three units under three supervisors. With the addition of the new men, the force is divided into four units, each unit composed of both new and experienced men, under four supervisors.

Catalogue of Technical Books Published

The Chemical Publishing Co., of New York City, announces the publication of a technical book catalogue entitled "If I Only Had That Book." The catalogue lists over 1,300 domestic and foreign technical books of all publishers.

NOW DETROIT JEWEL and GARLAND Gas Ranges

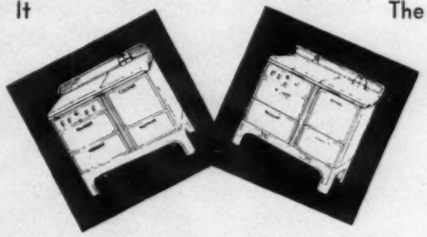
Fully Automatic with CERAMIC BROILER BURNERS and AUTOMATIC OVEN LIGHTERS

ELECTRIC TYPE
Automatic
OVEN LIGHTER

GAS TYPE
Automatic
OVEN LIGHTER

Consider these dramatic "plus" appeals now added to the great reputations of Detroit Jewel Gas Ranges and Garland Gas Ranges. To their well known, dependable standard of supreme construction, beautiful designs and finishes, convenient and efficient features, is now added the lure of perfected broiling and automatic oven lighting.

The Ceramic Broiler Burner is more than just a burner in a broiling compartment. It is a perfect Broiler! It provides rapid, thorough, even heat distribution and balanced temperature under all parts of burner. Radiant heat penetrates the food, cooking inside as well as outer surface . . . assuring evenly broiled food, uniformly delicious to the taste.



Detroit Jewel's and Garland's new Automatic Oven Lighters are designed for either gas or electric control and both installations are equipped with a super safety device that makes flow of gas to oven burners impossible unless pilot is in operation.

The display and demonstration of these Fully Automatic new Detroit Jewel and Garland Gas Ranges will prove a dramatic factor in achieving your most ambitious sales volume and profit objective for 1936.

DETROIT-MICHIGAN STOVE CO.

Detroit, Michigan

Gas Wastage in the Texas Panhandle

(Continued from Page 12)

of the plants, which have been operating at intervals during most of the life of the field. Most of the gas pipeline properties are situated in the high rock pressure area and therefore their gas is being drained by gasoline plant gas production. Even if the gasoline plants were to stop using gas, gas would continue to migrate to their area from the high rock pressure area until rock pressures become equalized over the field.

Gas Reserves and Life of Field

Estimates of original gas reserves in the Panhandle Field range from 12 trillion to 40 trillion cubic feet. It is believed that a conservative estimate of reserves is 18,626,000,000 M c.f.

Original Reserve	18,626,000,000 M c.f.
Withdrawals through 1934 (See Table No. 1)	4,686,315,858 M c.f.
Reserves Dec. 31, 1934	13,939,684,142 M c.f.

Following are the major gas pipelines and their daily capacities:

Canadian River Gas Co.	125,000 M c.f.
Lone Star Gas Co.	50,000 M c.f.
Northern Gas and Pipe Line Co.	150,000 M c.f.
Northern Texas Utilities Co.	42,000 M c.f.
Panhandle Eastern Pipe Line Co.	150,000 M c.f.
West Texas Gas Co.	35,000 M c.f.
Texas Panhandle Gas Co.	35,000 M c.f.
Natural Gas Pipe Line Co. of America	200,000 M c.f.
Cities Service Gas Pipe Line Co.	130,000 M c.f.
Total Capacity	917,000 M c.f.

It is assumed that Cities Service Gas Pipe Line will take gas at a rate of 33,612,432 M c.f. per year and Natural Gas Pipe Line Co. of America at 51,100,000 M c.f. per year. The other large pipelines are assumed to increase their takes by equal amounts for five years until they reach a load factor of 70 per cent, which would be a daily withdrawal of 410,900 M c.f., or annual withdrawal of 149,978,500 M c.f.

Ten small local pipelines have a daily capacity of 62,000 M c.f. and are assumed to increase their production 10 per cent each year after 1934 through 1939, after which it remains unchanged.

Withdrawals of gas pipelines under these assumptions would be as follows:

1935	177,254,389 M c.f.
1936	193,374,442 M c.f.
1937	209,544,807 M c.f.
1938	225,770,515 M c.f.
1939	242,057,098 M c.f.
Total 5 years	**1,048,001,251 M c.f.

Gas pipeline annual withdrawals after 1939 equal 242,057,098 M c.f. Assuming that gasoline plants consume gas during 1935 at the same rate which has existed through July, 1935, or at a daily rate of 1,797,042 M c.f., annual consumption by gasoline plants would be 655,920,330 M c.f.

Gas in addition to that withdrawn by pipelines then would be annually:

Gasoline Plants	655,920,330 M c.f.
Gas to Air from Oil Wells (Untreated)	33,800,000 M c.f.
Gas to Air Drilling Wells	12,020,000 M c.f.
Gas Used for Fuel Drilling	9,645,125 M c.f.
Total	*711,385,455 M c.f.

Annual withdrawals after 1939 would be:

Gas Pipelines	242,057,098 M c.f.
Other Gas	*711,385,455 M c.f.
Total	953,442,553 M c.f.

Withdrawals 1935-1939 inclusive would be:

Gas Pipelines	**1,048,001,251 M c.f.
Other Gas—5 years at *711,385,455 M c.f.	3,556,927,275 M c.f.
	4,604,928,526 M c.f.

For an additional 9 years—9 years at 953,442,553 M c.f.	8,580,982,977 M c.f.
Estimated Production 14 Years from December 31, 1934	13,185,911,503 M c.f.
Reserve December 31, 1934	13,939,684,142 M c.f.

At present rate of gas consumption for gasoline plant consumption and making allowance for increase in gas pipeline withdrawals, the field would last about 15 years from December 31, 1934.

But new gasoline plant additions are being built. If gasoline plant consumption should be doubled by 1939, increasing equally each year until then, the life of the field would be 10 years from December 31, 1934.

The Gas Pipeline Situation

The gas pipelines operating in the Panhandle Field consist of two groups, (1) Small local pipelines, and (2) Major pipelines whose lines extend over long distances and into other states than Texas.

The small local pipeline companies have small acreage holdings and relatively small pipeline investments. There are 10 of them in all with a daily capacity of about 62,000,000 cubic feet.

The major gas pipelines are nine in all with a total capacity of 917,000,000 cubic feet per day and pipelines totaling 4,530 miles in length. Three of these pipeline companies have small acreage holdings in the Panhandle Field and purchase some gas and have big acreage holdings in other gas fields to supply their markets. The rest of the major gas pipelines, which own the major part of the gas pipeline acreage, when organized, were financed on a basis of supplying their markets from the Panhandle Field. It was necessary for them to obtain dependable reserves before they could be financed, for which reason they invested many millions of dollars in sweet gas leases in the field and in buying and drilling gas wells there. They now own these leases, many of which carry drilling obligations which must be met to retain the acreage. They sell their gas to cities at the city gate at certain contract prices. These prices are based on the cost of producing gas from their own properties. On account of this situation, they have a very small lee-way in costs. Their only chance of getting their investment back is to produce the major part of their gas from their own leases. They also have legal obligations to their lessors which compel them to defend their leases from invalid laws or invalid orders of the Railroad Commission. If they failed to do this, their lessors could claim damages, perhaps even confiscate the leases. It is reported that they are willing, even under these conditions, in order to conserve gas, to purchase gas from outsiders under valid and equitable laws and orders, even though this entails a large sacrifice on their part. Obviously they cannot afford to do this under inequitable and invalid laws and orders.

The pipeline companies own approximately 61 per cent of the sweet gas acreage in the Panhandle Field, which is in the area of high rock pressure, which means that their acreage is subject to drainage from the gas produced in the low pressure areas and if they should purchase gas in the low pressure areas they would be purchasing gas drained from under their own leases. Their production during the life of the field has only totaled 14.69 per cent of the total gas produced. During the first seven months of 1935, their production was only 18.04 per cent of the total gas produced although they own 61 per cent of the sweet gas acreage. Others were producing at the rate of 81.96 per cent of the gas produced.

The pipeline companies owned on October 1, 1935, a total of 494 sweet gas wells with a total open flow of 10,276,906,000 cubic feet. Their production during the first seven months of 1935 averaged 446,078,000 cubic feet per day, or at a rate of 4.34 per cent of their sweet gas open flow.

If they should attempt to purchase gas from the entire sweet gas wells of the Panhandle Field, under present conditions of open flow and at their estimated peak level of withdrawals through present pipeline capacity, their daily takes would be 663,170,000 cubic feet, or 4.49 per cent of the total sweet gas open flow of the field, which is 14,768,883,000 cubic feet.

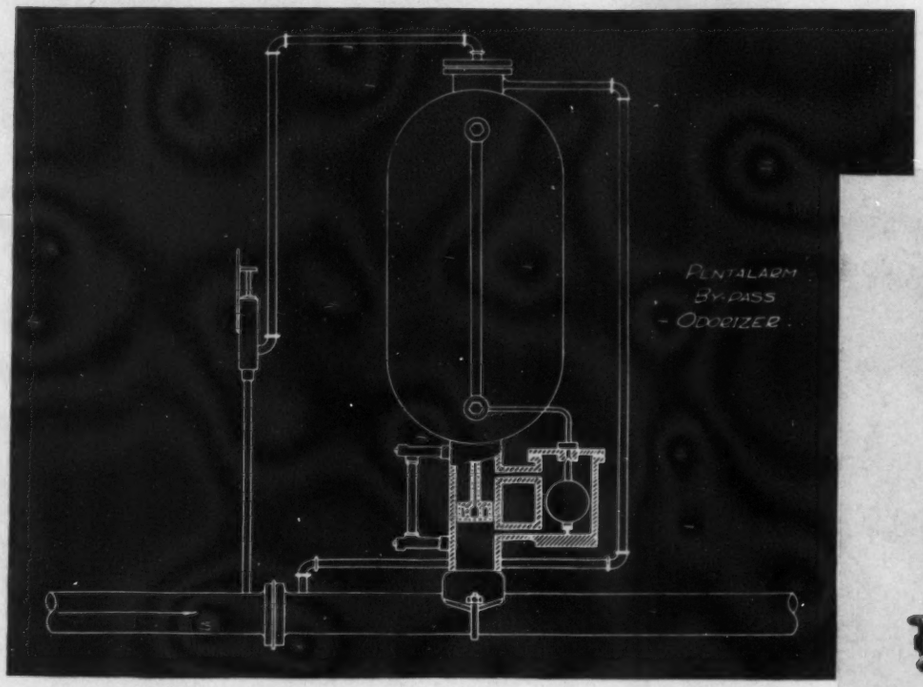
It is estimated that if the field should last 15 years from December 31, 1934, the pipeline companies would have produced during the life of the field 4,139,214,119,000 cubic feet, or 22 per cent of the original reserve of the field, as contrasted with their holdings which constitute at least 44 per cent of the total reserve of the field.

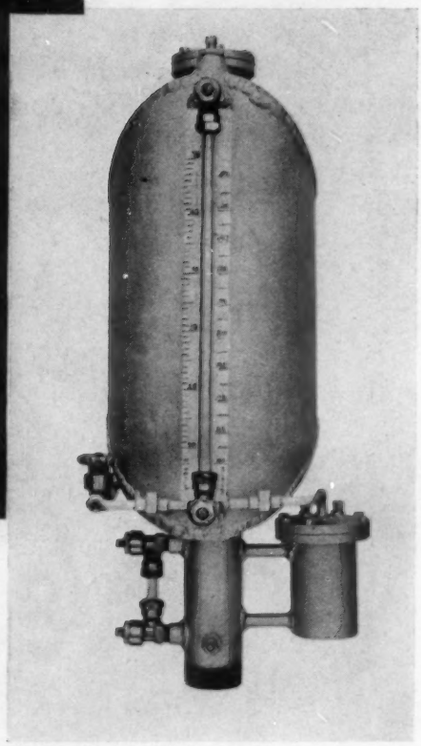
The pipeline companies could satisfy nobody by purchasing gas from the entire sweet gas field. The maximum production which they are capable of will not even drain the gas from under their own leases. Their operations are not draining gas from others. On the contrary, their own leases are being drained.

Texas Automatic Water Heater Drive

Texas Cities Gas Co. and Community Natural Gas Co., both headquartering in Dallas, together sold 2,643 automatic water heaters during a campaign through September and October, 1935. The drive was conducted in 250 Texas towns served by the two companies.

SAFE, TROUBLE-FREE ODORIZATION





AN ODORIZING UNIT THAT CAN'T CLOG NOR LOSE ADJUSTMENT

This Sharples Odorizing Unit . . . compact and fool-proof . . . affords safe, convenient, trouble-free and efficient odorization for fuel gases.

There is nothing to get out of order, no small orifice plates, no needle valves to clog and alter the adjustment. A small, accurately proportioned amount of gas is by-passed around an orifice plate or other constriction in the line. This small amount of gas is saturated with **PENTALARM** and returned to the main gas stream. Its action assures positive and continuous odorization.

PENTALARM

THE WARNING ODOR FOR FUEL GASES

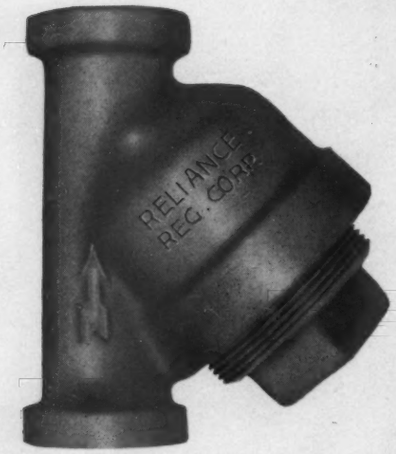
protects your investment by its powerful, distinctive, and far-reaching odor, detectable promptly at the first sign of escaping gas. Mixed in small amounts with the gas flowing through pipelines and mains, **PENTALARM** releases its penetrating odor instantly at the point of danger. Repairs can be made accurately and without delay.

Pentalarm your Pipelines!

THE SHARPLES SOLVENTS CORP.
2332 WESTMORELAND STREET, PHILADELPHIA, PENNSYLVANIA

SHARPLES SOLVENTS

TRAP the DUST with RELIANCE TYPE "A" FILTERS



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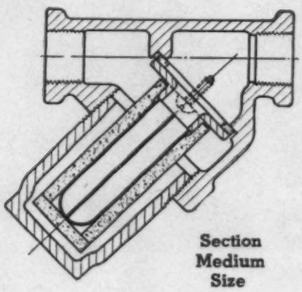
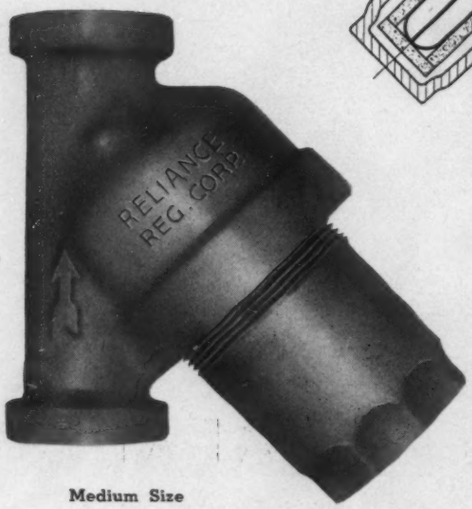


Section Medium Size



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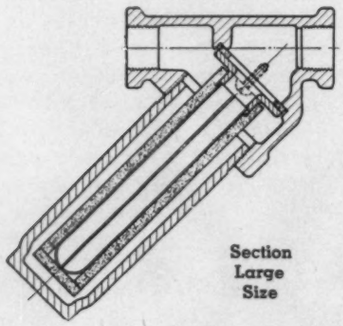


Section Large Size

Protect Service Lines, Meters, Regulators, Pilot Lights and other Appliances

Individual installations of Reliance Type "A" Dust Filters ahead of the meter will prevent accumulations in the lines and all appliances served, and eliminate expensive operation and maintenance losses.

These Filters are made in ¾" size with uniform body that takes either the small, medium or large filter element. Connections are standard with female threads at both ends, or gasketed unions at either or both ends. Filter elements can be changed in size or replaced without removing the Filter body from the line. Filter elements have standard 2" pipe threads. Three sizes provide full range capacity. Installations can be made vertically or horizontally with the dust chamber hanging downward.

Filter pads are made with special all-wool felt, and all seams are securely cemented with a water-and-oil-proof compound, building up a complete dust-proof barrier between the inlet and outlet connections of the Filter. Moisture in the gas will not impair the effectiveness of the wool felt. Filter castings are made to withstand a working pressure of 150 pounds.

These simple, rugged, low-priced Filters will give continuous, efficient, care-free protection to all service lines in dust areas, with the elimination of hazards and expenses. Complete description in Bulletin No. 35. Secure your copy.

REGULATORS YOU CAN RELY ON
RELIANCE
SINCE 1910
TRADE MARK

RELIANCE REGULATOR CORPORATION
1000 Meridian Ave. Alhambra, California

RELIANCE REGULATORS

MEASUREMENT and CONTROL

Procedures Discussed for Application of New Orifice Meter Data

By C. B. HEARTWELL
Standard Gasoline Company

MR. HEARTWELL, who contributes the following discussion, was a member of the committee of six, representing three west coast associations (S.C.M.A., C.N.G.A., and P.C.G.A.), which prepared C.N.G.A. Bulletin TS 353. This bulletin is based upon gas measurement Report No. 2 recently issued by the Natural Gas Department of the American Gas Association.

C. B. HEARTWELL

Use of C.N.G.A. Bulletin TS 353 by gas companies and major oil companies of the Pacific Coast began January 1. As the exact procedures for computing orifice meter coefficients in line with the bulletin are not as yet fully standardized, it was felt that a discussion of possible methods, based upon practices thus far developed by the various companies, would be helpful at this time. A brief questionnaire was therefore circulated to the several oil and gas companies, and their coefficient meter record forms were secured. Representative examples of these forms are shown with Mr. Heartwell's article, and a general estimate is offered as to reasonable procedures to follow in use of Bulletin TS 353.—EDITOR.

THE primary purpose of preparing this discussion is to present various forms and methods used in computing gas coefficients for orifice meters in accordance with recommendations covered by California Natural Gasoline Association Bulletin TS-353. It is also hoped that from such a discussion there may evolve one or more practical methods acceptable to the industry, thus tending toward early standardization.

From the answers to a questionnaire returned by several companies on the Pacific Coast it is evident that nearly every gas measurement department is experimenting with a number of different procedures in an effort to arrive at the most practical application of the new data. All the experimentation appears to be toward the same objective, that is, to reduce the various operations to a minimum and still maintain a justified degree of accuracy to suit the individual case.

This brings up the question of acceptable tolerance and whether it should be within 1/10, ¼, or ½ of 1 per cent. This question naturally will have to be worked out by a co-operative method between parties, and in all cases the economics should be considered first.

There is, at present, a tendency to carry many corrections to the extreme and although it is not in error, it is in many cases unjustified.

In a recent article by Messrs. Beitler and Overbeck, published in the American Gas Association Monthly, for January, 1936, attention is called to the fact that the A.G.A. Report No. 2 places a tolerance of ½ of 1 per cent on the orifice flow constant. Therefore, it scarcely can be justified to carry many of the factors to extremes, especially those which are compensatory.

If this point is well taken it remains for the measurement departments to choose their tolerance by basing it upon two rules. (1) The accuracy of the physical equipment. (2) The economic value of the commodity metered. These two items should, in many cases, eliminate the necessity for a complicated and laborious method of coefficient computation.

Most companies have indicated that 5 to 10 minutes are required to compute and check an orifice meter coefficient in accordance with recommendations published in Bulletin TS-353. It can be seen readily that with 50 to 600 coefficients to be computed at least once each month considerable time will be consumed. While it may be argued that the results obtained are far more accurate, consideration should also be given to the economic practicability.

The accompanying figures show several forms which have been developed since the release of Bulletin TS-353, and which amply indicate the data necessary for gas coefficient computation.

Little explanation of the individual forms is necessary, because in most cases the procedure is indicated by equation. This is of considerable aid to the operator and is a big improvement over the forms used in years past.

It will be noted that Fig. 1 and Fig. 2 are set up to use a Reynolds Number factor, whereas Fig. 3 makes adjustment for Reynolds Number by adding cubic feet to the computed chart volume. Either method will give the same result if properly applied.

Fig. 4 covers both the coefficient record and the chart calculation. This form has been developed for the purpose of a permanent record in the case of more important volumes.

Fig. 5 is an excellent example of including all possible information relative to physical factors and method of computation. While this type of form will serve to good advantage where very large and important volumes are metered, it is perhaps too detailed for the majority of cases ordinarily encountered.

Both Fig. 4 and Fig. 5 show a slight change in the method of setting up the con-

METER SIZE _____ GAUGE RANGE _____ M _____ PIPE TAPS _____ FLANGE TAPS _____ ATMOS. PRESS. LBS. _____

COEFFICIENT RECORD

DATE EFFECTIVE	ORIFICE DIAM.	$\frac{d}{D}$	C	C x M	G	T	Fa x Fr	Fr v	$\frac{h}{hs}$	$\frac{Ps}{Psa}$	Fa z	Fs	C'	Cas / Cas	CR.

FIG. 1

stants and factors, which should prove advantageous. That is the combining of CM and S/M. This will eliminate two operations and possible sources of error.

After examining the forms the question arises as to how often correction factors should be changed, as this is the only source of time conservation, if time is to be considered.

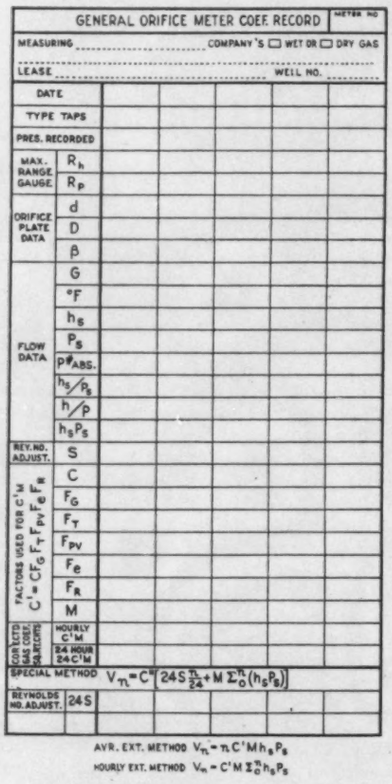


FIG. 2.

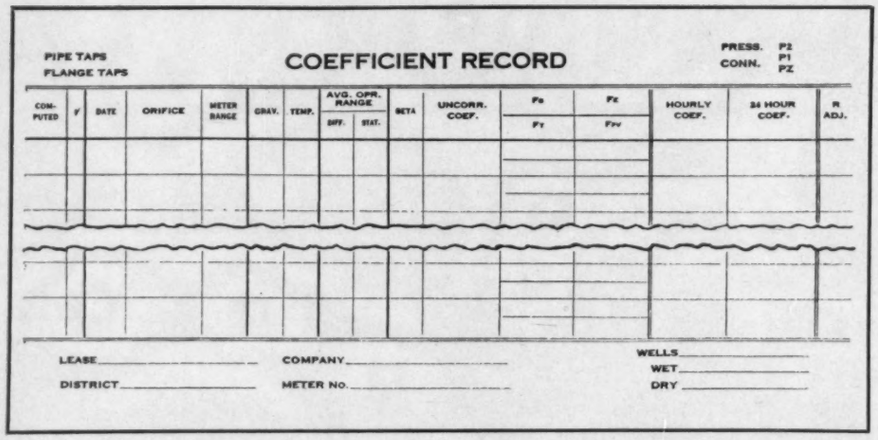


FIG. 3.

FACTOR CHANGES

(M):

Those using square root charts will find no easier way to eliminate this operation than to include the M factor with the C and S valve in table forms, both of which are practical.

(F_G and F_T):

The frequency with which these factors have been changed in some cases has been unjustified. That is, changes have been made for a difference of .001 gravity and 1 degree temperature, both of which were determined from spot tests. This is inconsistent except where recording gravitometers and thermometers are in use.

Where reliance is placed upon spot tests the trend is to make changes for every .005 in gravity and 5 degrees in temperature and in many cases this is broadened to the nearest .01 gravity and the nearest 10 degrees temperature. Combined tables can be computed for these two factors, and in the majority of cases are in actual use, thus eliminating one operation.

(F_{PV}):

This factor, in the near future, should be available in table forms. The frequency with which changes should be made will be dependent upon the accepted tolerance.

(F_E and F_R):

Table No. 1 outlines a suggested method of applying these new factors and while it may be considered too broad it has merits worth considering in the majority of cases.

(Continued on Page 42)

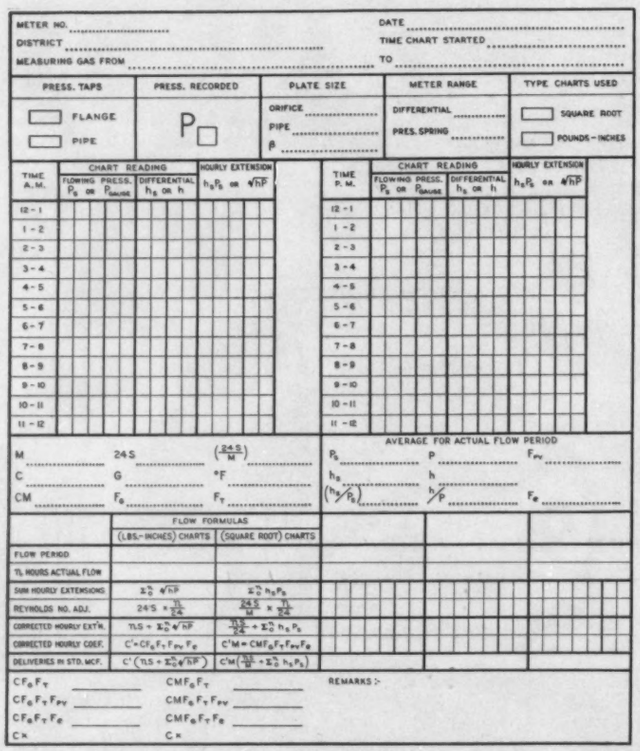


FIG. 4.

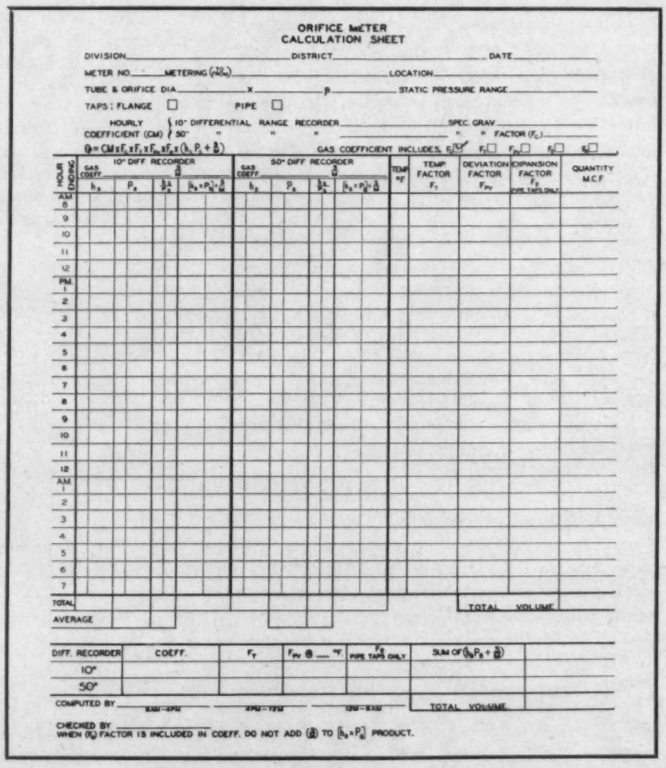


FIG. 5.

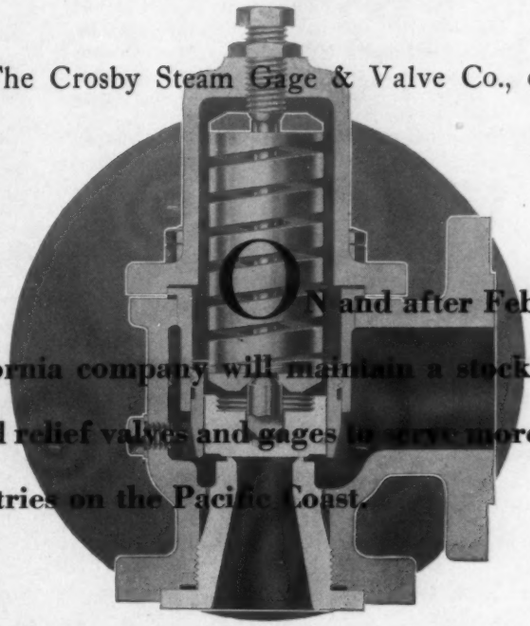
Announcing

The CROSBY STEAM GAGE & VALVE CO., Inc.
of California

2034 SANTA FE AVENUE, LOS ANGELES

Telephone KImball 3435

Subsidiary of The Crosby Steam Gage & Valve Co., of Boston, Mass.



ON and after February 3rd, the California company will maintain a stock of Crosby safety and relief valves and gages to serve more efficiently the industries on the Pacific Coast.

Mr. George H. Christen, sales engineer for Crosby products for the past ten years, is to be manager of the new company.

TABLE NO. 1. APPLICATION OF EXPANSION FACTOR, $F_{E'}$ ACCORDING TO VOLUME AND PRESSURE

Absolute Pressure	Method 1	Method 2	Method 3
	*Use intermediate pressure, or use F_{E2} and recompute with $F_G + F_T$	Use average F_{E2} changing when hs/ps varies 100% plus or 50% minus	Use average F_{E2} for each plate change
0– 65 lbs.	100 Mc.f. +	10 Mc.f.–100 Mc.f.	10 Mc.f.–
65–265 lbs.	500 Mc.f. +	10 Mc.f.–500 Mc.f.	10 Mc.f.–
265 lbs.+	Use method No. 3 for all volumes		

*Applicable for flange connections.

Reynolds Number Factor F_R:

The most practical methods of applying this adjustment are to include it in the coefficient, or add it to the computed volume. In either case it should be neglected where the adjustment makes no difference in the fourth significant figure of the final gas volume.

The inclusion of the above factors is the largest hindrance to speedy calculation; hence it will probably aid most operators to make a detailed study of their effect before making a definite ruling for their application.

Attention is again directed to the article by Messrs. Beitler and Overbeck, who recommend the method of adding F_E and F_R and applying the combined factor in various ways to previously grouped meters.

When in doubt as to the advisibility of using a short cut, it is recommended that calculation be made throughout the range ordinarily encountered, using both short and long methods. From a comparison of the results it may be determined where the short method lies within the accuracy expected in the particular case.

When the original equation is studied and a few experiments are made towards its simplification it will be found to be less laborious than was originally anticipated.

The fact remains, however, that good measurement is not dependent upon the extreme application of numerous factors, but upon the physical equipment and the method used in determining the conditions under which it is operating.

Orifice Meter Symposium at S. C. M. A. Session

ATTRACTED by a program which featured a symposium on the new orifice meter coefficient procedure, upwards of 100 members and friends of the Southern California Meter Association met at the Cole Cafeteria in Huntington Park, Calif., for the Association's January 23 dinner meeting.

Charles J. Soyster of the Richfield Oil Co. was first introduced by President F. E. Bradley, to offer an interesting paper on "Slide Rule Settings for Metermen". Mr. Soyster gave numerous practical examples of how to apply the slide rule to measurement problems in this discussion, which will appear in an early issue of *Western Gas.*

Following Mr. Soyster's paper the meeting was given over to the symposium on orifice meter coefficients, directed by C. B. Heartwell of the Standard Gasoline Co., a past-president of the Association and a member of the joint committee which developed C. N. G. A. Bulletin TS 353. P. W. Hill of the General Petroleum Corp. and B. G. Williams of the Southern California Gas Co., members of the same committee, also were present and contributed to the discussion.

The general discussion proceeded by questions from the floor and answers by the committee members, with a great many participating. Points touched upon are effectively covered by Mr. Heartwell in an article appearing in this issue; with it are shown coefficient record forms now in use by several of the major west coast companies.

Announcement was made by President Bradley that the Hancock Expedition picture and orchestral program recently given under auspices of the S. C. M. A. was to be repeated on the evening of January 29 for the benefit of those unable to secure tickets for the first performance.

George Christen of Crosby Steam Gage & Valve Co., Inc., program chairman of the Association, announced that the February 29 meeting of the group would be the annual Hi Jinks, selection of location not having been made as yet.

L. A. G. and E. Employees' Evening Classes

The Educational Committee of the Los Angeles Gas and Electric Corp. Employees' Association has organized 29 evening study classes in which 1,304 employees are now enrolled. Among the courses offered are Practical English, Trouble Shooting, Elements of Public Utility Practice, Gas Utilization, Heating and Ventilating, and Air Conditioning. A news sheet is published by the Committee for distribution at classes called the "Nite Lamp."

George H. Christen Pacific Coast Mgr. Crosby Steam Gage & Valve Co.

THE Crosby Steam Gage & Valve Co., Inc., is opening offices and warehouse at 2034 Santa Fe Ave., Los Angeles. Appointment of George H. Christen as Pacific Coast Manager for the Crosby organization has been announced to become effective early in February, the appointment being made by Major Geo. F. Felker, Crosby vice-president.

An office and complete warehouse stocks, together with repair and testing equipment, will be maintained for the Crosby line at Los Angeles. The entire Pacific Coast and western states will be supplied from this office. Among the products stocked will be the Crosby indicating and recording gauges,

G. F. FELKER

G. H. CHRISTEN

safety and relief valves, and gauge testing apparatus.

Mr. Christen has been associated with Wescott & Greis, and the American Meter Co., in Los Angeles for the past 10 years, having been made Los Angeles Manager for Pacific Meter Works in 1933. He has been active in the work of the Southern California Meter Association and the California Natural Gasoline Association, serving this year as chairman of the S. C. M. A. entertainment committee. He is also a member of the Pacific Coast Gas Association.

Major Felker is well known in California, having been a frequent visitor to the west coast for the past several years. He was a major in the original California 91st Overseas Division. He and Mrs. Felker arrived in Los Angeles in November, and are wintering at the Biltmore Hotel.

Republic Steel Corp. General Offices Moved to Cleveland

EFFECTIVE January 25, the general offices of Republic Steel Corp., were removed from Youngstown, Ohio, to Cleveland, Ohio, it is announced by T. M. Girdler, president and chairman of the board of Republic. The offices will occupy floors 13 to 16 inclusive in the former Medical Arts Building, recently renamed the Republic Building.

The move consolidates the general offices which have been located in Youngstown, the executive and Cleveland district sales offices and the advertising department, Massillon, Ohio. The sales offices of the Newton Steel Co. will be located in the Republic Building also. The sales offices of the Alloy Steel Division of Republic will remain in Massillon.

Mead District Manager at Pomona for Southern Counties Gas Co.

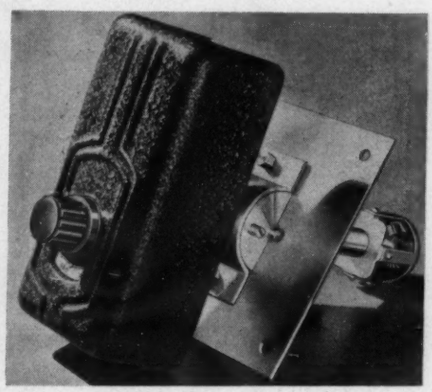
HOMER R. MEAD

HOMER R. Mead, Southern Counties Gas Co. district manager at Monrovia, Calif., last month was appointed district manager for the company at Pomona. Mr. Mead succeeds W. E. Keefe who has been Pomona district manager for the past four years and resigned to devote his time to agriculture in northern California.

Mr. Mead began his work with Southern Counties in 1918 as a meter reader. He advanced steadily, being made district chief clerk at Monrovia in 1926 and manager of the Pomona district in 1932.

Spencer Thermostat Announces New Bonnet, Fan and Duct Control

SPENCER Thermostat Co., Attleboro, Mass., announces a new thermostat for bonnet, fan and duct control which has a voltage range up to 250 volts. The new control has the feature of an adjustable range and an adjustable differential.

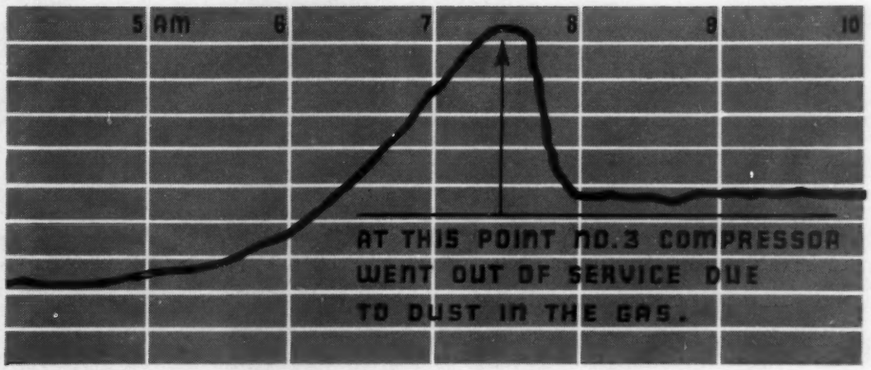


When mounted with the element in the plenum chamber of a furnace, the thermostat may be used either as a high limit control or as a fan switch to permit fan operation only when heat is available. The mounting bracket is swiveled for convenience in mounting. The thermal unit is the corrugated Spencer Klixon disc.

California Oil and Gas Association Officers Elected for 1936

AT the recent annual election of the California Oil and Gas Association, A. L. Weil, president of General Petroleum Corp., was elected president of the Association, succeeding C. S. Jones. Ralph B. Lloyd, president of the Lloyd Corp., and L. P. St. Clair, president of the Union Oil Co., both vice-presidents of the Association, were re-elected. H. L. Westbrook, vice-president of the Belridge Oil Co., was re-elected treasurer. F. E. Foster and D. S. Kilgour continue respectively as managing director and assistant manager.

THIS MIGHT HAPPEN TO ANY UNPROTECTED COMPRESSOR



The curve shows the time the #3 gas compresssor in a large pumping station broke down due to dust in the gas. It was repaired at high cost as it simply had to be put in operation with the least possible delay.

After this an installation of Blaw-Knox Gas Cleaners was made to avoid a recurrence of this preventable and expensive annoyance.

There is no mystery about Blaw-Knox Gas Cleaners. They wash out all of the dust and debris and admit nothing but clean dry gas to the compressors.

Write for detailed information and engineering advice about the best and most economical installation of this equipment to fit your conditions.

BLAW-KNOX GAS CLEANERS

BLAW-KNOX COMPANY

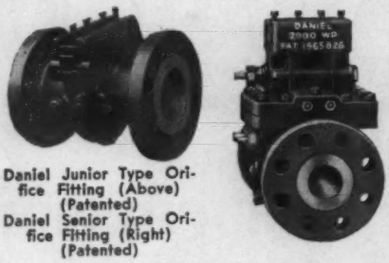
2033 FARMERS BANK BUILDING PITTSBURGH, PENNSYLVANIA

U. S. SUPER de LAVAUD CAST IRON PIPE

"Cast without chill in a metal mold"

U. S. PIPE AND FOUNDRY COMPANY

Burlington, N. J.



Daniel Junior Type Orifice Fitting (Above) (Patented)
Daniel Senior Type Orifice Fitting (Right) (Patented)

DANIEL ORIFICE FITTINGS Meet All New A.G.A. Requirements

The Industry's endorsement of DANIEL Orifice Fittings is based upon tested and proved performance under the most severe conditions. Repeat orders, in growing numbers, from satisfied DANIEL users are convincing proof of the fact that it **pays to standardize** on DANIEL Orifice Fittings. Write for prices, specifications and technical data.

DANIEL ORIFICE FITTING COMPANY
2719 Elm St. Phone CA 9228 Los Angeles, Calif.

Model Natural Gas Installation for Port Lavaca

TEXAS Natural Gas Utilities, headquartering in Houston, expected last month to complete its natural gas distribution system in the town of Port Lavaca, Texas, according to Frank C. Smith, general manager. The new system is to be supplied through a 4-inch line from a Halliburton Oil Producing Co. well located about 1½ miles northwest of the city limits. The distribution system will consist principally of 2-inch mains and will carry intermediate pressure.

The company anticipates a final saturation of about 200 domestic consumers with additional commercial installations. The principal industrial consumer calls for supplying gas to the municipal market which will pack and ship fish and oysters taken from Lavaca Bay.

While it will serve but few customers, the Port Lavaca system will be in the nature of a model installation. Various kinds of pipe and pipe coatings are being used, in accordance with soil tests every 100 feet for "hot spots."

The company does not sell appliances but is cooperating with Port Lavaca dealers in placing at their disposal discount facilities for time payment sales for periods as long as 48 months, without recourse on the dealers. The company thus provides complete installation of service line, house piping and appliances without cash payment to customers on F. H. A. terms, and each case means a cash sale to the dealers. It is believed that this is the first instance of a complete town installation on such terms.

"Mystery Chef" Program Drawing Large Response

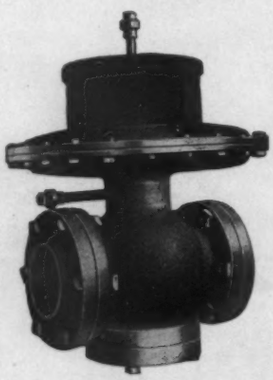
COMPANIES with 110,000 domestic gas meters in active service have joined The Mystery Chef radio program since it went on the air December 3. There are now 97 gas and gas and electric companies participating in this project, with total domestic meters of 5,400,000.

The demand for the recipe book by radio listeners is continuing at a rate higher than anticipated. In slightly less than two months a total of 365,000 books have been called for in person at the offices of gas companies by those who have heard the program on their radios.

The first electrical transcriptions have been sold to the Metropolitan Utilities District at Omaha, Neb., through the advertising firm of Bozell & Jacobs, Inc. The program went on the air January 21 in Omaha on a two-times per week basis, with contracts signed for 26 weeks.

The cost of electrical transcriptions of the program range from $15 per transcription for companies having 30,000 or less domestic meters in service, to $75 per transcription for companies having one million domestic meters in operation. Letters requesting information should be addressed to Charles W. Person, Regional Advertisers, Inc., Room 550, 420 Lexington Ave., New York, N. Y.

Pressure Kept Constant as low as two ounces



Either natural or manufactured gas, taken at any inlet pressure up to 15 pounds, can be reduced to a uniform delivery pressure anywhere between two and six ounces by use of the Fulton Dead Weight Regulator. This is a highly sensitive regulator and perfectly dependable. No stuffing boxes. Can be used as a district governor or for individual service. Specially well adapted for delivering constant pressure to a gas engine. Sizes 3 inches and over have flanged connections, those below 3 inches, screw connections. For relieving line pressures below six ounces, use of a Fulton Dead Weight Relief Valve is recommended. Chaplin-Fulton Regulators for every requirement of pressure control have been used and approved for over fifty years. Catalog on request.

CF

Dead Weight REGULATOR

THE CHAPLIN-FULTON MFG. COMPANY

28-40 Penn Avenue **Pittsburgh, Pa.**

"Metallurgical Dialogue" Published

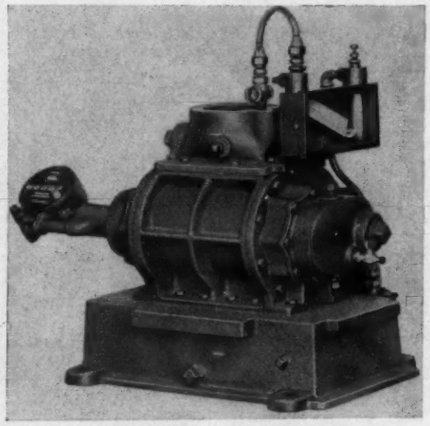
American Society for Metals, Cleveland, has recently published a book entitled "Metallurgical Dialogue," by Albert Sauveur, Sc.D., the Gordon McKay Professor of metallurgy and metallography in Harvard University. The book is written as an imaginary interview between the Dean of American Metallurgists and a typical Harvard under-graduate, and treats of such topics as hysteresis, ferrite, alloy steels, manganese, creep, corrosion, etc. Dr. Sauveur is the author of "The Metallurgy of Iron and Steel."

C. B. Phillips, Surface Combustion Vice-President, on West Coast

Planning to spend several weeks on the west coast, on a combined business and pleasure trip, C. B. Phillips, vice-president in charge of sales for Surface Combustion Corp. of Toledo, Ohio, arrived in Los Angeles in January. Natural Gas Equipment Inc. is Pacific Coast agent for Surface Combustion, and Mr. Phillips will be in close touch with N. G. E. executives during his time in California.

Roots-Connersville Blower Corp. Announces New Small Gas Meter

ROOTS-Connersville Blower Corp., Connersville, Ind., announces a new small size, 2½ by 7 meter, built for line pressures up to 25 pounds per sq. in. The new unit measures 22- by 14- by 15-inch and has a normal capacity of 5,000 cu. ft. per hour



at 1 inch water gauge differential, but it is claimed that it will maintain commercial accuracy on loads ranging from 10 to 150 per cent of normal rating.

This meter operates by rotary motion and is constructed of iron and steel throughout. It is supplied with a base for foundation mounting, but when called for is furnished with a special bottom pipe plate for direct mounting on vertical gas lines. Standard equipment includes a differential gauge and a volume register reading in cubic feet. Indicating or recording instruments are supplied when required.

The unit is applicable to small gas plant operation, industrial and commercial gas installations, low pressure natural gas wells and transmission lines, chemical processes, sewage gas measurement and measurement of gas engine fuel consumption.

Employees Encouraged to Submit Helpful Suggestions

SIX employees of the Public Service Co. of Northern Illinois were awarded prizes for submitting suggestions during 1935 which are helpful in the better conduct of the utility business. The award for first prize was $100, second prize $50, third prize $25, fourth prize $20. The second prize was divided among three men submitting a suggestion jointly. It is estimated that application of the suggestions will result in an annual saving to the company of $3,000.

The selections are made by a Standardization and Suggestions Committee of which Hugh Jones is secretary. First prize suggestion was that a standard rate be obtained from cartage companies for delivery of appliances from company to customers; second prize, for the designing of the necessary parts for converting G type demand meters from graphic to indicating type instruments; third prize, for change in type of boiler dampers; and fourth prize, for the submission of the largest number of useful suggestions.

Gordon Scott to Conduct Consulting Service in Los Angeles

Gordon Scott, for the past eight years associated with the American Petroleum Institute, has opened an office in Los Angeles and will engage in pipe line consulting work, also handling several lines of pipe line equipment. For the first seven years of his connection with the A. P. I., Mr. Scott was research associate at the Bureau of Standards, Washington, D. C., and during the last year was pipe line technologist at Dallas, Texas.

Mr. Scott attended the University of California, and in 1926 received his Ph.D. from that school. He is known widely throughout the oil and gas industries for his contributions in the field of pipe line corrosion work, pipe protection and maintenance.

Several Large Gas Wells Completed in Michigan Field

Several large gas wells have been completed in Michigan recently which increase considerably the state's known natural gas reserves. Refiners Petroleum Corp. No. 1 Susannah Statsick in Millbrook Township, Muskegon County, was brought in with an open flow capacity of 12,000,000 cu. ft., extending the Millbrook-Hinton-Belvidere field about 1½ miles. Taggart Bros., Inc., No. 21 in Austin Township, Mecosta County, tested 50,000,000 cu. ft. and is understood to be the largest gas well in Michigan. Five other wells recently completed in Mecosta and Montcalm Counties have added 37,710,000 cu. ft. to the daily capacity of the Michigan field.

Cut Expenses by Pushing Pipe Under Streets and Lawns with a Greenlee Hydraulic Pusher

The Greenlee Hydraulic Pipe Pusher is self-contained. It operates on a notched steel base, so that it is necessary to reset the pipe clamp only every 4 to 7 feet, depending on the length of base used. By taking advantage of hydraulic pressure, this tool has been made very compact and easy to operate. One man, standing in a comfortable position, can exert the maximum pressure of 40,000 pounds on the pipe clamp. Capacity is provided for pipe from 1¼ to 4-inch.

Any tool that will soon pay for itself through savings is a good investment. And that is what the Greenlee Hydraulic Pipe Pusher is. It saves time and labor by eliminating the need of extensive trenching, back-filling, tamping, etc. This makes it unnecessary to tear up lawns and pavements in order to install underground pipe for gas, water, and electricity. All that is needed is to make a trench long enough to accommodate the pusher with a section of pipe, and one man can furnish sufficient power to send it where it is wanted, simply by pumping the levers.

GREENLEE TOOL CO.
1700 Columbia Ave.
ROCKFORD, ILLINOIS

LET US SEND COMPLETE DETAILS

GREENLEE TOOL CO., 1700 Columbia Ave., Rockford, Ill.
Please send complete details on the Greenlee Hydraulic Pipe Pusher.

Company .....
Address .....
City ..... State .....
By WG2-36

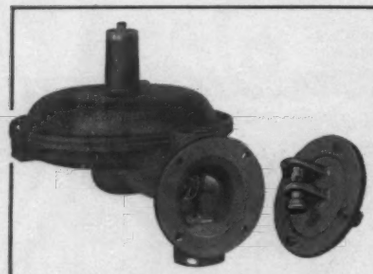
Natural Gas Bureau to Hold Commercial Cooking Equipment Exhibit

THE Natural Gas Bureau, which is sponsored by the Los Angeles Gas and Electric Corp., Southern California Gas Co. and Southern Counties Gas Co., will participate in an exhibit of commercial cooking and baking equipment to be featured at the convention of the National Restaurant Association at the Biltmore Hotel, Los Angeles, March 16, 17 and 18. The Bureau will have 720 sq. ft. of floor space for equipment display and will have an exhibit of photographs of commercial installations.

Equipment that will be represented in the Natural Gas Bureau exhibit are the Blodgett bake oven, and the Garland, Madsen, Magic Chef, Wedgewood, Wolf and Vulcan commercial ranges. George Heckler, of Southern California Gas Co., is in charge of the arrangements.

N. G. E. Opens Bakersfield Office

Natural Gas Equipment, Inc., Los Angeles, announces the opening of an office in Bakersfield, Calif., at 1024 Truxtun Ave. This new office will supply sales and service to the gas and oil companies in that area and will be under the management of Charles D. Lanzit.



Weight Loaded; Spring Loaded or Combined Weight and Spring . . . With or Without Mercury Seal . . . Convenient Vent . . . No threaded or flanged parts under high pressure.

Service Regulators Connelly Type GV

Pounds to pounds or pounds to inches . . . Efficient Control . . . Fully Accessible . . . Double guided, renewable stream-lined, soft-seated valve gives increased capacity . . . Easy replaceable valve port for changed condition . . . All parts can be inspected or serviced without removing Regulator from line.

Write for Bulletins

Connelly Caloroptic—BTU Indicator
Regulators—Station, District, Service, Appliance
Back Pressure Valves . . . U-Gauges
Iron Sponge (Ready Mixed)
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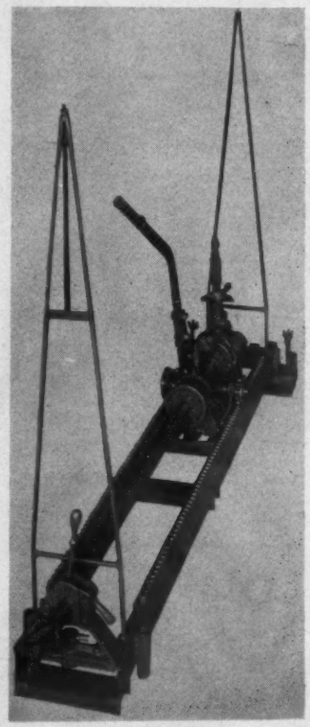
Ensign Carburetor Co., Ltd., 450 E. Ohio St., Chicago, Ill. Mid-Continent Distribution and Service Facilities Maintained by: A. W. Schuller, Inc., 114-116 E. 9th St., Tulsa, Okla. The Binkley Co., Oklahoma City, Okla.; Portable Rig Co., Houston, Dallas and Longview, Texas.

Hydrauger Corp. Announces Improved Model Horizontal Boring Machine

THE Hydrauger Corp., Ltd., San Francisco, announces a new improved horizontal boring machine which is 4 feet shorter than the previous model yet has the same rated capacity. Length of the sectional boring



bars has been reduced to 56 inches which weigh less than 20 pounds each and are connected to each other with special bar joints. The new model is equipped with a 5 h.p. air motor and bits and reamers incorporating new type cutting edges.

A horizontal boring distance of 100 feet on holes up to 14½ inches in diameter with a misalignment of less than 10 inches per 100 feet is claimed for this Hydrauger model.

Public Service Co. of Northern Ill. Acquires New Properties

Public Service Co. of Northern Illinois recently acquired the properties of the Calumet City Public Service Co. and the McHenry County Light and Power Co., adding 7,000 gas and electric meters to its system.

The Calumet City company served Calumet City and Burnham, having a combined population of 12,994. The McHenry company's service covered 10 small towns with an aggregate population of 5,000.

Measurement and Gas Control Building for So. Calif. Gas

Construction of a measurement and gas control building is under way by the Southern California Gas Co. at its distribution headquarters, 1700 Santa Fe Ave., Los Angeles. The building is of modern steel construction, using metal lath and plaster. Meter installations for all outgoing lines are included in the set-up, which is expected to be in operation by March 15.

BUTANE-PROPANE NEWS

Butane Application and Performance in Automotive Service

By PAUL W. ENSIGN

President and Chief Engineer
Ensign Carburetor Company, Ltd.
Huntington Park, California*

THE rapid development in the use of multiple cylinder engines as power units for a wide variety of service, using either natural gas or liquefied petroleum gas as fuel, indicated to us that there would be a demand for a specialized type of carburetor apparatus.

PAUL W. ENSIGN

So far as the principles of carburetion are concerned, the only difference in such fuels as regards the engine is their B.t.u. content and pressure variation.

Our laboratory staff made many test runs on our dynamometers and flow bench so that they might find out all they could as regards the characteristics and fundamental variables of such fuels in comparison to gasoline with which they have dealt for the past 25 years.

Experience has indicated that field tests must be run in conjunction with laboratory tests. These field tests were not confined to California and our engineers and the writer have had considerable experience in the laboratory on the engines of over a dozen manufacturers to whom well sell our equipment. Actual experience has been had with butane-propane conversions in 10 states on engines for a variety of service and with temperature from 17° below zero to 118° above, and with varying atmospheric conditions as found 250 feet below to 6,000 feet above sea level.

Much experience has been had with truck fleets and with a large contracting firm which converted approximately 150 units used for a multiplicity of service.

Accurate records are now being compiled by a bus fleet operator who has converted approximately 60 busses to butane and who expects to have about 90 units in operation shortly after the first of January.

It should be borne in mind that up to the present time, most of the experience with butane as fuel for internal combustion engines has been gained from the conversion of engines which were designed and developed to use gasoline. Built into these engines are characteristics of design necessary to efficiency of operation on gasoline, which are unnecessary or in some cases, detrimental to efficient operation when the engine is converted to use butane. In any comparisons which may be made between the Diesel engine and the internal combustion gasoline engine which has been converted to use butane, consideration must be given to the fact that the Diesel engine is primarily built to use a special fuel.

It is the writer's opinion that butane is the finest fuel yet developed for internal combustion engines and that when used with proper precautions, it is as safe as a motor fuel as other volatile motor fuels.

Specifications and Characteristics

Butane as referred to in this paper is a liquefied hydrocarbon composed principally of butane and propane, and it is essentially different from other liquid motor fuels as it is normally a gas, liquefied only for ease of transportation and storage. As commercial butane in the sense in which the term is used, covers a rather wide range, a few characteristics will be given of a fuel containing approximately 50 per cent normal butane, 30 per cent iso-butane and 20 per cent propane as used for motor fuel in the West during the warmer months.

Initial boiling point	11° F.
Final boiling point	30° F.
Vapor pressure at 20° F.	5 lbs.
Vapor pressure at 100° F.	75 lbs.

Latent heat of vaporization at boiling point —165 B.t.u. per pound and 775 B.t.u. per gallon.

Heat values compared with those of gasoline are:

	Butane	*Gasoline*
B.t.u. per pound	21,200	20,700
B.t.u. per gallon	102,000	127,000
Octane Number	100	65

Laboratory and Field Experience

Butane as fuel for internal combustion engines has been successfully and economically used in the engines of stationary power units, in trucks, busses, locomotives, rail cars and automobiles, the latter in most cases being for test or demonstration purposes. Many manufacturers of automotive engines have used commercial butane for a considerable period of running in and production test of their product.

Butane may be used as it passes from the liquid to the vapor state for refrigeration of the pay load of a truck or for air conditioning of a bus or rail car. This can be accomplished at no additional fuel expense and is being practiced on trucks and busses at the present time.

Various papers have been published giving performance curves and other specific data which in the main dealt with the results of tests on a specific engine, and in each case higher compression ratio was used with butane than with gasoline, making direct comparison impossible. These tests, run under very favorable laboratory conditions, show exceptional power and efficiency. It is from such tests that we determine the maximum possible results obtainable. In this way we arrive at the generally accepted ratio of air to gas by weight of 15.5 to 1 for butane as compared to 15 to 1 for gasoline. However, it is not often possible to operate engines successfully in the field on mixtures leaner than 14 to 1 of either butane or gasoline. For this reason it is not always wise to use laboratory tests as a measure of what may be expected in the field. Following is a comparison of consumption characteristics of both butane and gasoline run on an engine with the same compression ratio of 4.8 to 1:

	Butane	*Gasoline*
Pounds of fuel per H.P.H.	0.565	0.615
B.t.u. required per H.P.H.	12,000	12,750
Brake horsepower per gallon per hour	8.5	10.

For the purpose of comparison with the laboratory figures just given, results of certain road tests using an exhaust analyzer are submitted. Car driven over same road, in same direction with speed held constant for a sufficient time to get accurate reading:

	AIR TO GAS RATIO	
Miles per Hour	*Butane*	*Gasoline*
20	13.1	13.1
30	13.3	13.1
40	13.4	13.5
50	13.3	13.3
60	13.1	13.5

The result of a certain exhaustive road test made with a maximum load limit truck and trailer, Ethyl gasoline vs. butane, 6:1 compression ratio, may be summed up as follows:

	Butane	*Gasoline*
B.t.u. used per ton mile per hour	1,076	1,261

Field experience has been had with a wide range of engines as to age, class of service, type, number of cylinders, piston displacement and speed. Such experience covers tractor and truck engines now out of production as well as late model 4-, 6-, and 8-cylinder units of practically all makes, with a wide range in piston displacement and operating speeds from 650 to 3750 R.P.M.

From experience with this wide variety of equipment operated by many firms and individuals, it has been proven that when butane conversions are properly made, remarkable savings in overall cost of operation will result, either from decreased fuel cost per gallon, decreased fuel consumption or increased power, and in some cases from all three. In addition, a reduction in cost of engine repairs may be expected because of the elimin-

(Continued on Page 54)

* Presented before San Francisco regional meeting of the Society of Automotive Engineers, November 18, 1935.

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FORGED BRASS
CYLINDER VALVES
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FLARE FITTINGS
for
PROPANE
BOTTLED GAS
SERVICE

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KEROTEST MFG. CO.
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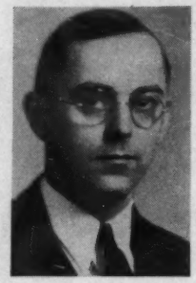
Thomas Re-elected President of Bottled Gas Men

H. EMERSON THOMAS was re-elected president of the National Bottled Gas Association at its fifth annual meeting, held January 22 at the Waldorf-Astoria Hotel in New York City. J. E. Balsley, of Standard Oil Co. of California, San Francisco, was elected first vice-president, with Harry Strickler, of Protane Corp., Erie, Pa., elected second vice-president. Franklin R. Fetherston was re-elected secretary and treasurer.



H. E. THOMAS

The following were selected as the Executive Board:

Mark Anton, Suburban Gas Co., Verona, N. J.; F. W. Warner, Jr., Superfuel Co., Tampa, Fla.; H. P. Aikman, H. P. Aikman Co., Cazenovia, N. Y.; P. E. Pope, Fuelite Natural Gas Corp., Lexington, Mass.; E. G. Richardson, Shell Petroleum Co., St. Louis, Mo.; Harry Strickler, Protane Corp., Erie, Pa.; A. N. Kerr, Imperial Gas Co., Los Angeles, Calif.; H. Emerson Thomas, Phillips Petroleum Co., New York, N. Y.; Paul Zook, Sloan & Zook, Kane, Pa., Walter Verkamp, Verkamp Corp., Cincinnati, O.; Howard Double, Bradford Gasoline Co., Bradford, Pa.; George Bach, Skelly Oil Co., Kansas City, Mo.; Edward Braen, Braen & Gouchee, Hawthorne, N. J.; H. W. Richdale, Vapyre Corp., Pleasantville, N. J.; J. A. Balsley, Standard Oil Co. of Calif., San Francisco.

At the day's meeting, attended by approximately 100 members of the industry, a varied program of speeches was presented, with major attention being given to load-building, appliance efficiency and general sales problems.

John MacPherson, the "Mystery Chef" of the American Gas Association's radio broadcasts, was a luncheon speaker, his talk dealing with cooking as a hobby for men. He cited a number of famous men who have been proficient in the culinary art and pointed out the advantage to appliance marketers of approaching their sales problems with first-hand knowledge of the kitchen.

In a paper prepared by E. D. McElvain, attorney for the Philgas Department of Phillips Petroleum Co., an analysis was made of the Federal Revenue Act of 1935 insofar as it affects the bottled gas industry.

E. G. Rodgers, of Phillips Petroleum Co., who is chairman of a committee appointed to assist the Department of Agriculture in the preparation of a pamphlet featuring bottled gas for farm homes, gave a detailed resume of the work thus far done along this line. The pamphlet, when published, will be made available at all Farm Bureau Stations, and it is probable that marketing companies will be able to secure quantities for circularization of prospective customers.

P. A. Anderson, of Utilities Distributors, Bangor, Me., spoke on gas load building. He emphasized the need for careful training of personnel, prompt attention to the complaints of dissatisfied users, and accurate knowledge of competitors' fuels.

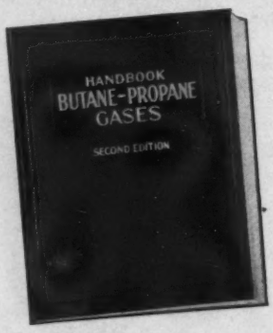
In a talk on the use of demonstrations in bottled gas selling, N. Engler, of Roberts & Mander Stove Co., stressed the value of maintaining an adequate showroom display of ranges, immaculately clean and so arranged that each range will catch the prospective customer's eye individually. For outside sales promotion work he recommended church basement demonstrations, where the sponsoring organization might be paid a small amount for each person present and a number of small prizes awarded as inducements to attend.

In a paper prepared by Robert S. Moulton, technical secretary of the National Fire Protection Association, the bottled gas industry was urged to observe safety measures with scrupulous care, both to prevent loss of life and property and also to forestall the enactment of restrictive legislation.

E. F. Garno, of Floyd-Wells Stove Co., talked on the desirability of impressing upon the housewife that modern gas appliances will conserve her time and energy. M. G. Farrar, of Carbide and Carbon Chemicals Corp., told of the work which the Association is carrying on in conjunction with the American Gas Association Testing Laboratories for improving appliance efficiency, and stated that along this line lay the solution to the problem of electric competition.

At the afternoon business session it was agreed to appoint a committee to consider the advisability of changing the Association's name to make it more inclusive, several applications for membership having been re-

THE ONLY
HANDBOOK OF
BUTANE–
PROPANE
GASES



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CONTENTS: Summary of Two Years' Developments: Use in Internal Combustion Engines: Design and Installation of Storage: Supply from Petroleum Refineries: Engineering Data on the Lower Olefins: Domestic Appliance Testing and Utilization: Economic Comparisons with Coal, Oil, Electricity, Producer Gas, Manufactured Gas: Town Plants: Manufacture from Natural Gas: Special Uses: Volume Correction Factors: Supplements and Revisions: Transportation: Use with Other Gases: Analysis and Testing: Properties of Mixtures: Bottled Gas Distribution: Bibliography: Central Plant Directory: Catalogue Section:

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ceived from companies in foreign countries. A resolution was passed to submit to the President of the United States and to senators and representatives a request that the Federal Housing Administration be extended beyond its present expiration date. It was further voted to continue work on the establishment of a Pacific Coast branch of the Association.

Propane Utilized for Railway Coach Air Conditioning

CHICAGO NORTH WESTERN Railway has released an order for 28 Waukesha Ice Engine units, using propane fuel, for railway air conditioning, as part of an equipment program that is expected to extend to more than double this number of cars for the coming summer.

The Waukesha apparatus is a self-contained power driven railway refrigerating unit. The first unit of this type was put into service early last summer by the North Western, and led to the adoption of this apparatus as standard equipment for the company's future air-conditioning requirements.

The ice engine, as shown in the accompanying illustration, is suspended from the under frame of the car and supported by pneumatic tires on a channel iron track. This suspension absorbs road shock, and insulates the mechanism from the vibration of the car. At the same time, while the pneumatic suspension protects the mechanism, the passengers are protected against any vibrations or noise that might originate in the ice engine.

The fuel used is bottled propane gas which is delivered in steel containers and supported in a cabinet bolted to the under frame of the car. Enough propane can be carried in the regular installation to operate the ice engine continuously for 60 hours.

Operation of the unit does not impose any additional traction load, nor require steam or electricity generated by the locomotive. It is automatic in operation, starting and stopping without attention other than the setting of the thermostat within the car to the desired car temperature.

C. G. M. A. Elects New Officers at Annual Meeting

The Compressed Gas Manufacturers' Association held its 23rd annual meeting January 20 and 21 at the Waldorf-Astoria Hotel in New York City.

W. P. Uhler, of S. S. White Dental Mfg. Co., New York, N. Y., was elected president. E. A. Faulhaber, of Compressed Industrial Gases, Inc., Chicago, Ill., was selected as first vice-president, and W. N. Cochran, of Crystal Carbonic Laboratories, Atlanta, Ga., was named second vice-president. Franklin R. Fetherston was reelected secretary and treasurer.

Propane Air Conditioning Bulletin

The Philgas Department of Phillips Petroleum Co. has issued a new bulletin, No. 57, entitled "Air Conditioning Railway Coaches with Propane Fueled Refrigeration Unit." Copies may be obtained from the Philgas Detroit Office.

THE OVERWHELMING FAVORITE

There must be a reason why Hackney Liquefied Petroleum Gas Cylinders outnumber all others in service *combined* by two to one.

There must be a reason why such blue ribbon firms as: Shell, Standard, Phillips, Hope, Skelly—choose Hackney cylinders.

There is a reason. It is the efficient design and faultless workmanship of Hackney cylinders. Hackney has built them ever since Butane, Propane and Butane-Propane mixtures were first developed.

PRESSED STEEL TANK COMPANY

208 S. La Salle St. Bldg. Room 1185 CHICAGO, ILL.
6633 Greenfield Ave. MILWAUKEE, WIS.

Hackney MILWAUKEE

1363 Vanderbilt Concourse Bldg. NEW YORK, N. Y.
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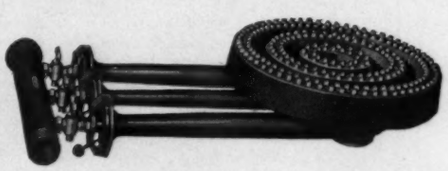
CONTAINERS FOR GASES, LIQUIDS AND SOLIDS



JOHNSON 40 ABC RING BURNERS

For any installation where heat is required.

Made up of three independent ring burners which may be used singly, in pairs, or in triple. Designed and built for efficiency, endurance, and economy. These famous atmospheric ring burners embody important features found only on Johnson products. Write for full details.

JOHNSON GAS APPLIANCE CO. Cedar Rapids IOWA

Western Representative: C. B. BABCOCK CO. 135 Bluxome Street San Francisco, Calif.

Eastern Representative: J. H. McPHERSON 250 Stuart Street Boston, Mass.

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Volume 8, No. 2 *Eighth consecutive year of regional cooperative advertising, Pacific Coast Gas Association* February, 1936

GAS WATER HEATING FEATURED IN FEBRUARY MAGAZINES

BELOW — *Reduced facsimile of full-page advertisement directed to domestic consumers, prepared under the direction of Cooperative Advertising Committee.*

Luxury Is Theme of This Attractive Advertisement That Also Stresses Economy

Designed to assist all units of the Gas Industry — manufacturers, dealers, gas companies — in promoting water heater sales, this dominant ad will appear in February issues of leading Pacific Coast home-consumer magazines.

"Sunset" Magazine, reaching more than 200,000 urban and suburban homes from Seattle to San Diego, will not only *deliver* this timely message, but also *keep it alive* for weeks and months, since thousands of subscribers keep their "Sunsets" for reference, and loan them to friends.

February Schedule

The water-heating ad will appear not only in "Sunset" but in parent-teacher and club women's magazines as well.

Other publications selected by the Committee for February insertions include: Western Baker & Pacific Baker; Architect & Engineer; California Arts & Architecture; California Homes; Western Restaurant; Pacific Coast Record; Western Furniture Retailing; and Western Plumbing and Heating Journal. Each will carry special "copy."

Reprints Available

Reprints of any of the P. C. G. A. advertisements will be supplied at cost on order. Address the office of the Association, 447 Sutter Street, San Francisco.

News Service

Among other new publicity "stories" prepared by the Association's News Service, a comprehensive article appeared in January "Western Furniture Retailing." It showed that nearly $7,000,000 worth of gas appliances were sold during 1935 in P. G. & E. territory alone, an increase over 1934 of 37%.

no *Luxury* so Inexpensive ...no *Economy* so Luxurious as *Instant, Ample* HOT WATER

Luxury goes on the bargain counter as the entire gas industry unites to make more of its benefits available to all.

Here is the forward-looking program: *Still better gas appliances, priced for even greater value, on easier terms, at less financing cost to you; and the lowest possible gas rates consistent with sound management and good service.*

Now any home can afford unstinted, automatically-heated water that flows, sparkling-clear and steaming, at the flip of a faucet in kitchen, bath or laundry.

Behind the scenes — a sturdy, faithful, AUTOMATIC GAS WATER HEATER that *runs itself* for mere pennies-per-day; lowest in operating cost, highest in efficiency by every known test.

Is your present water heater a service-worn veteran? Or a non-gas type that impels hot water economy to avoid fuel-bill extravagance? Then a GAS AUTOMATIC may actually pay for itself in monthly savings. *Investigate.*

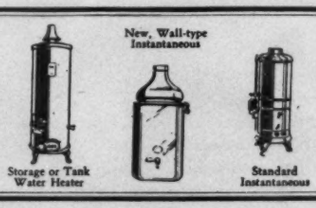
As for tea kettle, water-back, furnace-coil makeshifts — why, they belong to grandmother's time! Modern homes demand equal comfort in January or June, at midnight or at noon — and *get* it, with Gas, the Modern Fuel.

Make this health-and-comfort resolution: *"I will see my gas company, plumber or appliance dealer about a new* GAS AUTOMATIC *today — and assure years of luxurious, yet thrifty, tomorrows."*

PACIFIC COAST GAS ASSOCIATION, INC.
(A non-profit service organization of which your Gas Company is a member)
447 SUTTER STREET
SAN FRANCISCO, CALIF.

Gas THE MODERN FUEL

HOT WATER is needed in the average home 150 times a day. It sterilizes dishes and clothing; fights germs that lurk in sinks, tubs, toilets, hidden corners. Frequent hot-water bathing and hand washing, doctors agree, reduces danger of infection. *Health insurance!*



IMPORTANT. Choose an appliance (storage or instantaneous) with capacity ample for your family's peak requirements. And make sure it bears the Blue Star Seal of the American Gas Association, which means: "Laboratory tested and approved — by rigid engineering standards." *Your protection.*

With the ASSOCIATIONS

S. G. A. Convention Tentative Program Announced

THE Southern Gas Association will hold its 1936 annual convention February 19 to 21 at the Roosevelt Hotel in New Orleans. In conjunction with it the A. G. A. Commercial Section will conduct its Southern-Southwestern Regional Gas Sales Conference. The three mornings will be devoted to the Southern Gas Association sessions and the afternoons, to the Sales Conference program. Following is the S. G. A. tentative general sessions program as supplied by S. L. Drumm, secretary-treasurer of the Association:

Morning, February 19

"Greetings from the A. G. A.," L. B. Denning, Sr., President, American Gas Association.

President's Address: C. B. Gamble, President, S. G. A., Birmingham Gas Co., Birmingham, Ala.

Regional Activities, H. E. Meade, First Vice-President, S. G. A., New Orleans Public Service Inc., New Orleans.

Morning, February 20

"Extending the Scope of Our Service," Chas. Evans, Arkansas Power & Light Co., Pine Bluff, Ark.

"Fire Hazards in Residences Due to Heating Plants," W. A. Hudson, Birmingham Gas Co., Birmingham, Ala.

"Advertising Possibilities of Tying-in Hot Water with Other Products," Speaker to be announced.

Morning, February 21

Address by Floyd Parsons, Robbins Publishing Co., Inc., New York, N. Y.

"Mrs. Fastest Cook in the South," W. E. Leverette, Nashville Gas and Heating Co., Nashville, Tenn.

The program of the Southern-Southwestern Regional Gas Sales Conference is the following:

Afternoon, February 19

"Economics of Long Term Appliance Financing," R. S. Murphy, Commercial Investment Trust, Inc., New York, N. Y.

"Application of Gas to Air Conditioning," Carl Dean, Oklahoma Natural Gas Corp., Tulsa, Okla.

"Meeting Electric Competition," Speaker to be announced.

Afternoon, February 20

"Selling Gas for Hot Water Service," Speaker to be announced.

"National Automatic Gas Water Heater Sales Campaign," W. A. McIntyre, Peoples Gas Co., Port Arthur, Texas.

"Gas Appliances—A Mutual Opportunity," John Moore, Colonial Home Furnishings Co., New Orleans, La.

"National Gas Range Sales Contest," W. E. Derwent, Domestic Range Committee, A. G. A., Rockford, Ill.

"Promoting House Heating in All of Its Phases," Dean A. Strickland, United Gas System, Houston, Texas.

"America's Public Health Enemy No. 1," Chester L. May, Community Natural Gas Co., Dallas, Texas.

Afternoon, February 21

"Dramatizing Merchandise Sales," R. C. Anderson, Memphis Power & Light Co., Memphis, Tenn.

"Model Kitchen Promotion," R. O. Berry, Jacksonville Gas Co., Jacksonville, Fla.

"Establishing Leadership for Gas Refrigeration in 1936," B. H. Gardner, chairman, Refrigeration Commitee, A. G. A., Columbus, Ohio.

"Employee Sales and Prospect Development," C. H. Zachary, Southern Union Gas Co., Dallas, Texas.

Morning, February 22, Home Service Session

Presiding: Albertine Berry, Lone Star Gas Co., Dallas, Texas.

"Radio, One of the Branches of Home Service," Margaret Marable, Lone Star Gas Co., Dallas, Texas.

"Home Service Records as Signposts to Sales," Mildred Clark, Oklahoma Natural Gas Co., Tulsa, Okla.

"Special Lecture Demonstration Courses," Nell Read, San Antonio Public Service Co., San Antonio, Texas.

"Home Service Functions in the A. G. A. Sales Campaigns," Jessie McQueen, American Gas Association, New York, N. Y.

"Symposium on Home Service Aids in Southern Sales Plans," Speakers to be announced.

February 21 is the opening day of the Mardi Gras. Those planning attendance at the meetings are urged to make hotel reservations immediately.

P. C. G. A. Spring Conferences to be Held in Los Angeles

THE Spring Sales Conference of the Sales and Advertising Section of the Pacific Coast Gas Association will be held March 19 and 20 in the auditorium of the Los Angeles Gas and Electric Corp. at Los Angeles, as announced by W. M. Jacobs, chairman of the Section. The conference will include discussions of current problems of company sales departments.

The Accounting Section will also hold meetings on March 19 and 20, and a meeting devoted to discussion of credits and installment sales will be held jointly with the Sales and Advertising Section. Lester Green, of L. A. G. and E., is chairman of the Accounting Section.

The P. C. G. A. Spring Technical Conference will be held March 26 and 27, also in

Calendar

February

Eastern Natural Gas Sales Conference (A.G.A.) — Wm. Penn Hotel, Pittsburgh, Pa., February 6-8.

Mid-West Regional Sales Conference (A.G.A.) — Sherman Hotel, Chicago, Ill., February 13-15.

Southern Gas Association — Annual Meeting, Roosevelt Hotel, New Orleans, La., February 26-28.

Southern-Southwestern Regional Gas Sales Conference (A.G.A.)—Roosevelt Hotel, New Orleans, La., February 26-28.

March

Industrial Gas Section, A.G.A.—Industrial Gas Sales Conference, Hotel Statler, Detroit, Mich.,March 10 and 11.

Pacific Coast Gas Association, Sales and Advertising Section, and Accounting Section—Spring Conferences, Los Angeles Gas and Electric Corp. Auditorium, Los Angeles, Calif., March 19 and 20.

Pacific Coast Gas Association, Technical Section—Spring Conference, Los Angeles Gas and Electric Corp. Auditorium, Los Angeles, Calif., March 26 and 27.

April

American Gas Association—Distribution Conference, Hotel Peabody, Memphis, Tenn., April 6 and 7.

Mid-West Gas Association—31st Annual Convention, Minneapolis, Minn., April 13-15.

Missouri Association of Public Utilities—Annual Convention, Jefferson Hotel, St. Louis, Mo., April 29, 30 and May 1.

May

Natural Gas Department, American Gas Association—Annual Spring Meeting, Hotel Baker and Hotel Adolphus, Dallas, Texas, May 5-8.

American Gas Association—Production and Chemical Conference, New York, N. Y., May 25-27.

Industrial Gas Section, A. G. A.—Commercial Gas and Hotel and Restaurant Symposium, Washington, D.C., May 26 and 27.

July

Canadian Gas Association Annual Meeting, and *Pacific Coast Gas Association*, Northwest Conference, Hotel Vancouver, Vancouver, B. C., July 8-10.

October

American Gas Association—18th Annual Convention, Atlantic City, N. J., week of October 26.

7 Reasons
FOR SUPERIORITY
Payne "A" Gas Vent

✦ 1 ✦

The inner Aluminum tube is constructed of 99% pure aluminum, made especially for Payne "A" Gas Vent. Laboratory tests prove that acid sometimes set up through products of combustion of gas is not a corrosive agent so far as this pure aluminum is concerned.

✦ 2 ✦

Rapid heating of inner tube assures hot stack immediately, consequently more perfect draft and quicker and better combustion of gas fuel.

✦ 3 ✦

Aircell insulation around inner tube prevents heat loss and cooling of products of combustion. A constant stack temperature is maintained.

✦ 4 ✦

Outer galvanized iron casing is a protection to inner pipe and insulation and gives rigidity against earth shock or vibration.

✦ 5 ✦

Because of its light weight Payne "A" Gas Vent is installed with greater ease and the shipping cost is considerably less. There is positively no breakage.

✦ 6 ✦

Payne "A" Gas Vent is listed by the Underwriters' Laboratories under Re-examination Service (File MH 2694). Also has the Recommendation Sanction of the Pacific Coast Building Officials Conference.

✦ 7 ✦

An orange spiral marking is used for prompt identification and is being copyrighted for the protection of those interested in proper venting of gas burning appliances.

Only products listed by the Underwriters' Laboratories under Reexamination Service are entitled to use the above seal, which is stamped on each section of Payne "A" Gas Vent Pipe.

PAYNE FURNACE & SUPPLY COMPANY
Beverly Hills, California

the L.A.G. and E. auditorium. The program is to feature work in progress by the Distribution, Transmission and Utilization Committees. P. E. Beckman, chairman of the Technical Section, announces that the meetings in the main will be round table discussions but that several sub-committee reports will be presented.

C.G.A. and P.C.G.A. Joint Meeting Program Plans Nearing Completion

ARRANGEMENTS are being completed for the joint meeting of the Canadian Gas Association and the Pacific Coast Gas Association, which is to be held in Vancouver, B. C., July 8, 9, and 10. This will be the 29th annual convention of the Canadian Gas Association, with the Pacific Coast Gas Association participating in the program in lieu of its regular annual Northwest Conference.

Major J. J. Humphreys of Montreal, Quebec, chairman of the Program Committee of the Canadian Gas Association, is cooperating with John Keillor of Vancouver, C. G. A. president, and with the officers of the P. C. G. A. in the development of a program which will be of mutual interest to the manufactured and natural gas interests of Canada and of the Pacific Coast. George W. Allen of Toronto, Ontario, secretary of the C. G. A., is taking an active part in arranging the program which will soon be ready for publication.

The 29th convention of the C. G. A. will be the first time the Association has ever held a convention west of Winnipeg, and it celebrates not only Mr. Keillor's presidency of the association, but also marks the 50th Jubilee Anniversary of the city of Vancouver, and an important anniversary of the British Columbia Electric Railway Co.

A. G. A. E. M. Delegation Due on Pacific Coast

W. J. BAILEY, chairman of the Manufacturers' Section of the Pacific Coast Gas Association, is making arrangements on behalf of western manufacturers to greet an eastern delegation of representatives from the recently formed Association of Gas Appliance and Equipment Manufacturers. Among the members of the delegation will be W. T. Rasch, president of the A. G. A. E. M.; Merrill N. Davis, vice-president; C. W. Berghorn, executive secretary; I. W. Peffly, chairman of the A. G. A. E. M. domestic gas range division; and J. P. Morley, president of the Bastian-Morley Co.

The purpose of the delegation is to acquaint the Pacific Coast gas industry with the aims and program of the A. G. A. E. M. A meeting has been scheduled for the week of February 3 in San Francisco, and another for the week of February 10 in Los Angeles.

Phillips Appointed Chairman of A.G.A. Rate Structure Committee

APPOINTMENT of Alfred I. Phillips of New York City as chairman of the American Gas Association Rate Structure Committee, has been announced by L. B. Denning, president of the A.G.A. Mr. Phillips has been a member of the Committee since 1929 and has contributed considerable material on therm rates, special rate forms and rate application.

Following graduation from Massachusetts Institute of Technology, Mr. Phillips went to the United Gas Improvement Co., after which he had a wide and varied experience in practically all phases of gas company operation. As service engineer of the A.G.A. he visited Great Britain and, among other things, studied the therm method of charging, then new, and British methods of rate regulation and rate forms. Also as service engineer, Mr. Phillips made a study of service charge rates which at the time were another innovation. Now in consulting practice, he has done considerable work on development of rates for house heating and industrial service.

Under the guidance of Mr. Phillips, the Rate Structure Committee expects to produce a report containing practical consideration of current rate matters.

Special Studies Planned Under P. C. G. A. Auspices

PAUL KUNTZ of the Los Angeles Gas and Electric Corp. has been appointed by E. J. Strickland, chairman of the Domestic Sales Committee, Commercial Section of the Pacific Coast Gas Association, to prepare a detailed report on ways and means of increasing gas consumption following construction of new lines.

Mr. Strickland has enlisted the aid of J. E. Kern of the Southern California Gas Co. in the preparation of a report on group appliance selling, and also of Clyde H. Potter of Southern Counties Gas Co. to study the most successful methods in the selling of fireplace heaters.

F. W. Thompson of Los Angeles Gas and Electric Corp. is delegated to prepare a study on methods and results of making survey data available to dealers.

C. A. Thorpe of Los Angeles Gas and Electric Corp. has been appointed by Guy Corfield, chairman of the Utilization Committee, Technical Section of the Pacific Coast Gas Association, to head a sub-committee which will make a study of the entire question of gas lighting.

P.C.G.A. Encourages Contribution of Gas Utilization Material

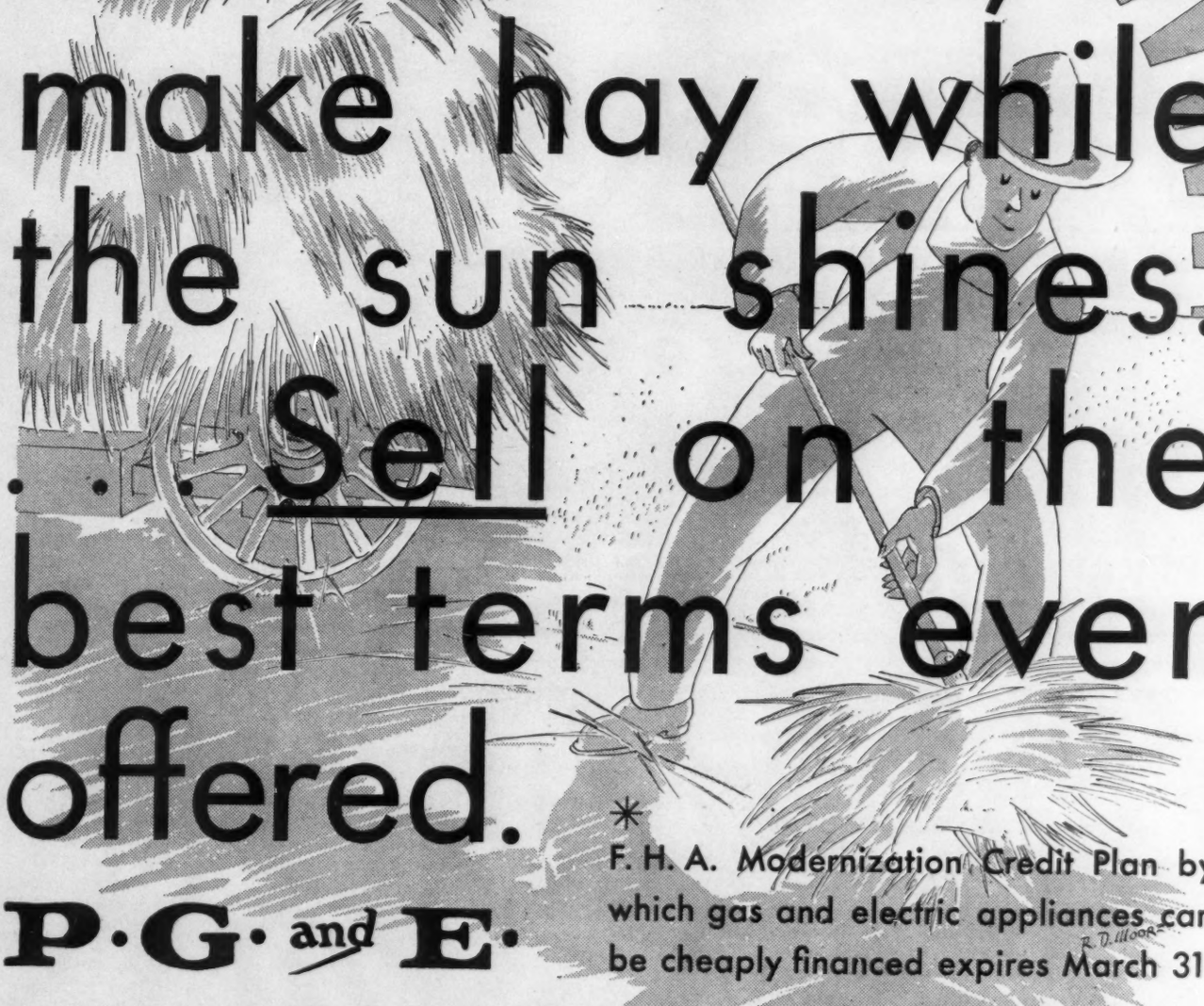
THE Industrial Sales Committee of the Pacific Coast Gas Association this year again is encouraging the contribution of gas utilization material for publication in its Gas Utilization Bulletins. Upon acceptance of material P. C. G. A. members will be awarded $5 per contribution. Non-members will receive a membership in the Association for the balance of the fiscal year. In addition, each successful contributor will be given a binder containing a complete set of Gas Utilization Bulletins issued to date, which now number 31 in all.

Material for the bulletins may deal with any phase of gas utilization and will be judged primarily on the basas of its usefulness. It may be submitted either to R. L. Grutzmacher, of Natural Gas Equipment, Inc., chairman of the Industrial Sales Committee, at 1123 Harrison St., San Francisco, or to P.C.G.A. headquarters at 447 Sutter St., San Francisco.

APPLIANCE INDUSTRY: ATTENTION!

Time's almost up!

F.H.A.* expires by law March 31, so make hay while the sun shines. . . Sell on the best terms ever offered.



P·G· and E·

* F. H. A. Modernization Credit Plan by which gas and electric appliances can be cheaply financed expires March 31.

PACIFIC·GAS·AND·ELECTRIC·COMPANY

WG-204-A30

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GAS SPECIALTIES

Designed . . . ★ to meet a definite need

★ Boost unit heater and gas burner sales — cut down maintenance and service costs—assure yourself of satisfied customers by specifving Inland Gas Specialties on every installation.

★ Send for our illustrated folder describing the complete line of Inland Products — Unit Heater Hanger, Canopy and Gas Cock Switch — Adjustable External Lighter, Safety Gas Cock, Copper Fire Pot Coils and Furnace Door Closer.

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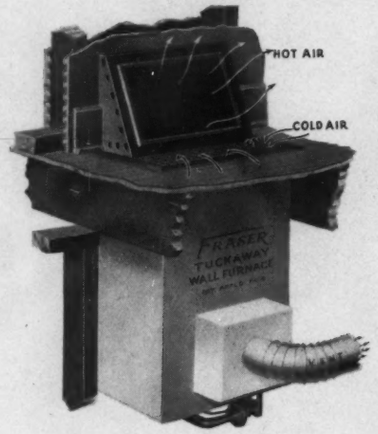

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Made in 4 sizes

Manufactured by

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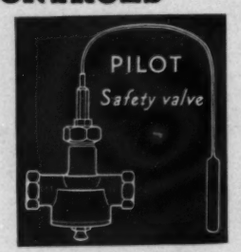
BUILD YOUR HOUSEHEATING LOAD WITH KLIXON CONTROLS

These two advanced Klixon devices give exact automatic temperature control and assure positive pilot protection for your gas-fired space heaters . . . provide sales features that make it easy to sell gas heating.

Write today for descriptive bulletins.



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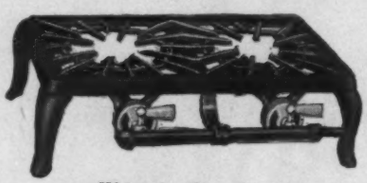
PEERLESS GAS HOT PLATES AND LAUNDRIES

Like Peerless Gas Heaters

Have a national reputation for long and satisfactory service—Complete line including one, two and three burner—High and low leg.



Write for Literature

PEERLESS MANUFACTURING CORP.

LOUISVILLE, KENTUCKY

Butane Application in Automotive Service

(Continued from Page 47)

ation of crank case dilution and the reduction of carbon deposit.

To make a definite statement of probable saving to be obtained from the use of butane as a motor fuel is obviously impossible. It may be said, however, that of all conversions that have been properly made, few if any, have ever been changed back to use gasoline, and owners of fleets equipped to use butane promptly equip any new units which they find necessary to purchase. During 1934 there were between 5,000,000 and 6,000,000 gallons of commercial butane used for motor fuel, and it is estimated that the consumption will amount to 8,000,000 gallons for 1935 in the State of California.

Operating Variables

The most common of these are: Compression ratio, combustion chamber type, ignition systems, manifold temperatures, fuel temperatures, and water jacket temperatures.

Compression Ratios may be raised to as high as 8 or 9 to 1 in the laboratory and very high power and efficiencies obtained, but it has been found in converting engines already in use that the limit of compression ratio is often determined by the capacity of the starting and ignition systems. Experience has shown that a ratio of 6 to 1 is ample in most cases to produce efficiencies somewhat better than with gasoline, but considering such variables as cylinder bore and combustion chamber design, it is obvious that no specific recommendation can be made with regard to compression ratio.

Combustion Chamber research in the last several years has been directed toward the suppression of detonation in gasoline engines with a great deal of success. Because of its lower combustion rate, butane does not require this modern type of combustion chamber unless extreme compression ratios are to be used. Experience indicates that the more successful the control of detonation with gasoline, the higher the compression ratio required to develop comparative efficiencies with butane.

Ignition Sytems with which modern engines are equipped will perform satisfactorily with moderate increase of compression ratio if kept in first class condition. Spark plugs, secondary cables and coils which have been used for some time and have seemed to operate satisfactorily on low compression engines, may often to expected to fail when the compression is increased. Reduction of the length of spark plug gaps is a poor substitute for ignition repairs. Change of ignition timing is not required except in a few cases.

The Intake Manifold Temperature is a major operating variable and often presents a considerable problem with engines which are converted in the field to utilize butane. Because of the fact that this fuel is used by the engine as a true gas with uniform distribution of fuel to all cylinders, the difficulties occasioned by wetting down the walls of the intake manifold or tendencies to condense therein are entirely eliminated. Heat applied to gasoline manifolds is partially ab-

sorbed by the vaporizing gasoline. When butane is used in the same manifold, the hot spots actually become much hotter because the latent heat has already been supplied to the fuel before entering the manifold. Thus the incoming charge is expanded to such an extent before entering the cylinder, that in some cases losses in efficiency and power result.

Fuel Temperatures. If temperatures are high enough to prevent any possibility of wet butane reaching the carburetor, the actual temperature at which the butane enters the carburetor makes little difference as it constitutes but 3 per cent by volume of the total charge. As the gas is delivered to the carburetor at substantially atmospheric pressure, its volume will vary directly with changes in the absolute temperature, and thus will cause large variations in flow through the metering orifice. From this it may be seen that it is of major importance that gas temperatures be held reasonably constant.

Gas temperature is best controlled by the use of a water jacketed heat exchanger of ample capacity to deliver gas at practically the same temperature as that of the engine water jacket. As the cooling systems of modern engines are controlled within close limits by thermostats, there is no better way of controlling the gas temperature without elaborate and expensive apparatus. It is very essential that conducting tubing be made as short as possible and placed so as not to pick up additional heat by radiation from the exhaust pipes.

Water Jacket Temperatures should be maintained the same as when using gasoline, namely between 160° and 180°.

Conversion Equipment

Four distinct stages are required to prepare the liquid butane, for the engine and are as follows: The initial regulation, application of heat, final regulation and carburetion. Following is a brief description of these functions, together with the necessary apparatus in sequence.

Butane is held in the fuel tank at its vapor pressure which may vary as much as 150 pounds per square inch according to the fuel specification and its temperature. The initial regulator reduces this variable pressure to a practically constant pressure of about 10 pounds and delivers liquid and vaporized butane to the heat exchanger. The valve of this regulator is water jacketed to prevent freezing which otherwise would result from the drop in temperature caused by the rapid expansion of the fuel.

In order for the heat exchanger to be effective, there must be a difference in temperature between the fuel to be heated and the water of the engine cooling system. When equipment has stood unused for a time, the water jacket and the fuel in the tank both will have approximately the same temperature and obviously no transfer of heat can occur. In order to bring about the necessary difference in temperature, the fuel must be delivered to the heat exchanger after the first stage of regulation, thus taking advantage of the drop in temperature caused by expansion.

Fuel is delivered from the heat exchanger as a gas under 10 pound pressure to the final regulator. This regulator is designed to deliver fuel to the carburetor at a pressure

THE IDEAL UPSHOT GAS BURNER FOR SQUARE AND RECTANGULAR BOILERS

Detailed information about the No. 313 and other N.G.E. gas burners, as well as valuable information about everyday commercial heating problems is contained in our COMMERCIAL HEATING BULLETIN. Write for your free copy today.

The N. G. E. No. 313 Gas Burner meets practically all requirements for commercial gas heating with cast iron or steel boilers having square or rectangular fire boxes. This classification includes Birchfield, Pacific, Kewanee and similar steel boilers.

The No. 313 burner units are simple in construction, easy to install and self-cleaning. They operate at all firing ranges quietly and without fluttering or vibration, and have very low turndown characteristics. Operating range: 2 inches of water to 2 lbs. gas pressure.

N. G. E. No. 313 Burners lend themselves ideally to manifolding—either at right angles or parallel to the water legs of the boiler. For best results these burners should be installed in the front of the furnace to permit longest travel of products of combustion.

The burner head of the No. 313 is so constructed as to receive a special refractory radiant which has the advantages of offering incandescent radiant heat and of serving as a catalyst in high rate of BTU liberation.

In proportion to the relatively small burner area occupied by the burner units and in comparison with other types of burners, the No. 313 offers extremely high capacities.

MANY N. G. E. NO. 313 BURNERS HAVE BEEN RECENTLY INSTALLED BY

Brogdex Company, La Verne
Consolidated Aircraft Corporation, San Diego
Continental Baking Co., Beverly Hills
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NATURAL GAS EQUIPMENT INC.

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AIR CONDITIONING
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FURNACES BLOWERS FILTERS WASHERS

Write for attractive Dealer proposition

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REFRACTORIES

GENERAL CERAMICS COMPANY

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For Conversion Burners, Circulating Heaters, etc.

Because they are uniformly accurate, strong, and dependable in every way, General Ceramics Refractories are used by most of the leading manufacturers of gas heating appliances. • Our engineers will gladly cooperate with you.

General Ceramics Company, 30 Rockefeller Plaza, New York

The Goodman Stopper

The Reliable Shut-off for Street Mains

Equipped with Improved Patented Locking Sleeve, which locks both handles to the pipe. Stopper cannot slip. Gas cannot pass.

Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, N. Y.

Pac. Coast Rep.: C. B. Babcock Co.
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San Francisco, California

COMBUSTION EQUIPMENT

For every firing and controlling requirement including a full line of the finest conversion burners ranging in price from 7.50 to 150.00.

NEMEC COMBUSTION ENGINEERS, WHITTIER, CALIF.
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MUELLER GAS DISTRIBUTION EQUIPMENT

The time-tested Mueller line includes Mueller Eventlow Service Regulators, Gas Stops, Service Stops, Stove Stops, Drilling and Tapping Machines, service boxes, meter trims and similar equipment. Write for description and prices.

MUELLER CO., Los Angeles, Calif.

Factories: Decatur, Ill.; Chattanooga, Tenn.; Los Angeles, Calif.; Sarnia, Ont.
Branches: New York and San Francisco

slightly below atmospheric. The function of this regulator may be compared to that of the float bowl of a gasoline carburetor. The function of either device is to supply an ample volume of fuel at a constant pressure to the metering or proportioning elements of the carburetor under such conditions as will cause the fuel to positively stop flowing when the demand for fuel has ceased. From this regulator the fuel flows directly to the carburetor.

The venturi type of carburetor, because of its simplicity and lack of moving or wearing parts and because of its certain inherent characteristics which make it ideal for perfect mixture proportioning, is more suitable than any other type for producing correct gas and air mixtures.

In many cases truck operators find it necessary to provide for the use of gasoline as a stand-by fuel for use when trucks are called upon to make trips beyond the range of their butane supply.

The only satisfactory method of making installations where both fuels must be readily available to the engine, is by the use of a combination butane and gasoline carburetor. Carburetors of this type are available and are provided with means for locking the float mechanism against the destructive effects of vibration. This is an absolute necessity in order to preserve the float mechanism during long periods of use without gasoline in the fuel bowl.

Conversions properly made which will result in an approximate gallon for gallon consumption and outside of any differential in costs, the advantages and savings from the utilization of butane as fuel may be summed up as follows: Increased power output, improved thermal efficiency, elimination of crank case dilution, reduction of carbon deposits, elimination of obnoxious exhaust gas odors and lessening of fire hazards.

In bringing this paper to a close these points should be emphasized regarding the conversion of units and use of butane in the field:

1. The layout and installation of butane equipment on an engine should be supervised by someone familiar with characteristics and principles involved.

Troubles encountered in engines not performing as well as expected in the field are largely the result of hasty or incomplete adaptations of the engines to the use of butane and not to the fuel itself.

2. Fuel should be supplied that will have sufficient vapor pressure to give a pressure of 5 pounds per square inch at the minimum atmospheric temperature likely to be encountered in the district in which the equipment is used.

3. The user of butane should understand that certain safety precautions, very little different than those that should be used with gasoline, must be observed. When this is done, butane is just as safe as any other volatile motor fuel.

National Oil Burner Show

The latest in oil burner equipment, of interest to gas men concerned with developments in competitive fuels, will be displayed at the Oil Burner Institute's 12th National Oil Burner Show to be held in Convention Hall, Detroit, Mich., April 14 to 18, 1936.

New A.G.A. Requirements for Floor Furnaces and Water Heaters

THE A.G.A. Approval Requirements Committee announced in December that all gas floor furnaces having A.G.A. Testing Laboratories approval must be equipped with gas pressure regulators, beginning July 1, 1936, regardless of the date of test and certification. As all floor furnaces approved by the Laboratories since January 1, 1935, have been equipped with pressure control accessories in accordance with American Standard Approval Requirements for Central Heating Gas Appliances since that date, the new ruling affects only those floor furnaces approved prior to January 1, 1935.

The Committee also ruled that all storage water heaters bearing A.G.A. approval will, on and after January 1, 1936, be supplied with relief or shut-off valves. The valves need not necessarily be attached to the heater by the manufacturer but must be shipped in the same crate with the heater and accompanied by instructions for installation. The relief or shut-off valves must limit both storage water pressure and temperature and comply with standard requirements.

Internal Combustion Engine Educational Film Prepared by Bureau of Mines

A newly revised, two-reel educational motion picture film entitled "The Power Within," dealing with the construction, operation and care of the internal combustion engine has been prepared under the supervision of the Bureau of Mines in cooperation with one of the large automobile manufacturers. The film covers the various applications of the internal combustion engine and the several essentials of its operation, including carburetion, firing, transmission gears, lubrication, etc.

Copies of the film in 16 or 35 mm. sizes may be borrowed without charge upon application to the Pittsburgh Experiment Station of the Bureau of Mines, Pittsburgh, Pa.

Gas Service Co. Has New Schedule on Water Heaters

A new schedule of rental rates and purchase prices for automatic storage gas water heaters with galvanized tanks has been made effective January 2 for the Gas Service Co. system, according to F. M. Rosenkrans, new business manager.

The new schedule is as follows:

Size Heater	Monthly Rental	Total Rental 60 Mos.	Cash Price
20 Gal.	$1.20	$72.00	$57.60
30 Gal.	1.45	87.00	69.60
40 Gal.	1.75	105.00	84.00
75 Gal.	.00	.00	149.50

The company's rental plan does not include water heaters above 40-gallon capacity.

P. G. and E. Making Final Appliance Drive Under F.H.A.

PACIFIC Gas and Electric Co., San Francisco, is making an intensive drive for appliance sales during the period remaining before expiration of the modernization section (Title One) of the Federal Housing Act. The act as originally passed provided for the termination of Title One on March 31, 1936.

The slogan of the P. G. and E. campaign is "A Million Dollar Month," inspired by the fact that during the concluding months of last year a figure of three-quarters of a million dollars per month was reached. Company advertising stresses F. H. A. terms and campaign activities include cooperative effort with manufacturers and dealers.

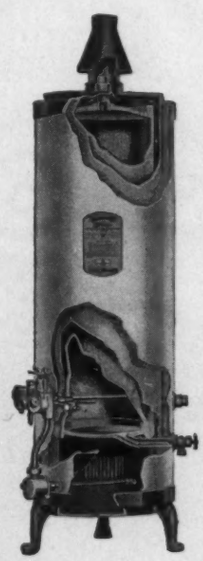
Gas Appliance Accessory Testing by A. G. A. Laboratories

Testing of gas appliance accessories, begun a year and a half ago by the A.G.A. Testing Laboratories, has grown to be an important activity, having been responsible for 25 per cent of the testing revenue of the Cleveland Laboratories in December, 1935. To date 188 models of 5 types of accessories produced by 22 manufacturers appear on the A.G.A. approved list. These items include conversion burners, burner valves, relief valves, automatic shut-off valves and pressure regulators. Thermostats, thermostatic pilots and automatic main gas control valves are awaiting test.

REGISTER then CHOOSE THE FAVORITE

NOW IN THE NATION-WIDE

"CLEAN-UP" CONTEST



Hotzone

HOTZONE GAS WATER HEATER

Here's why Hotzones are worthy of your consideration to help you make the 1936 water heater drive one grand success.

(1) Used by many of the leading Utilities and Jobbers throughout the Country exclusively.

(2) Hotzone Heaters have established a reputation for reliability—based on customer acceptance.

(3) Hotzone Heaters—known for low operating cost, and a minimum of service requirement.

(4) Selected for the "Model Home of America" Atlantic City, N. J.

(5) Behind this heater stands Welsbach's well earned reputation for reliable gas appliances produced with the technique which only a half a century old experience can provide.

Welsbach COMPANY

Gloucester, N. J.

BRANCHES IN CHICAGO AND SAN FRANCISCO

Since 1887, Pioneers in the Manufacture of Gas Burning Appliances.

Southern Counties' 25th Annual Sales Dinner

SOUTHERN Counties Gas Co., Los Angeles, Calif., held its 25th annual sales dinner on the evening of Thursday, January 16, to commemorate a notably successful year of sales promotion in 1935 and to announce plans to the sales staff for the current year.

A very complete program for the evening was arranged by Clyde H. Potter, commercial manager, who acted as toastmaster. Mr. Potter summarized the 1935 results by stating that merchandise in the amount of $883,000 had been sold, exceeding the quota of $750,000 by a comfortable margin. Southern Counties has established a 1936 sales goal of $1,000,000, indicating the general betterment in sales outlook.

Company executives, district managers, appliance men and speakers from outside the industry combined to offer a varied speaking program, shared in by President F. S. Wade, Vice-President N. R. McKee, W. G. Rich, C. B. Babcock, Frank C. Packer, E. B. Hanmer, "Skipper" Joseph Dixon, N R. McKee, and O. R. C. Grow. Much enjoyed also was a showing of a gas industry motion picture prepared by the three companies headquartering at Los Angeles, which was presented to the group by Fred Champion.

The guest roster included more than 100 members of the California gas industry, made up of the company sales and executive staff and visitors.

PACIFIC

Gas Heating Appliances

Whichever type of gas heating appliance you decide to buy, be sure it bears the name "PACIFIC"—Symbol of quality wherever gas heating appliances are used.

1. Circulator Heaters
2. Radiant Wall Heaters
3. Gas Steam Radiators
4. Floor Furnaces
5. Gravity Furnaces
6. Blower Furnaces
7. Unit Heaters
8. Forced Air Units
9. Water Heaters

Literature on request

PACIFIC GAS RADIATOR CO.

Huntington Park, California, U.S.A.

London Gas Co. Replacing Mains

Some $20,000 of construction work is scheduled for the next year by the City Gas Co. of London, Ontario. The work will consist of replacing old and small mains in various parts of the distribution system.

WANTED—SALESMAN

A real opportunity for a livewire man to earn big money handling our Pacific Coast and western U. S. business; should be familiar with gas-fired circulating heaters and gas ranges; knowledge of utility companies helpful. Write giving complete qualifications in first letter. THE MOORE CORPORATION, Joliet, Illinois.

HYDRAUGER

MODERN HORIZONTAL BORING MACHINE

For Underground Installation of Pipe and Conduits. Avoids damage to costly pavements and saves time. Send for Bulletin.

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The Big Name in
HEATING
and **AIR CONDITIONING**
is
MUELLER-MILWAUKEE

H. H. DUGDALE

HAROLD MASSEY

American Gas Products Corp. Promotes Dugdale and Massey

H. H. Dugdale, general sales manager of American Gas Products Corp., has been made vice-president in charge of sales, according to an announcement from William T. Rasch, president. Mr. Dugdale entered the employ of the A. H. Wolff Gas Radiator Co., predecessor of the American Gas Products Corp. in Chicago in 1924, and was made assistant sales manager a short time later. He was transferred to New York in 1927, and during the latter part of that year was made sales manager. Prior to entering the gas industry, he was superintendent of production and afterwards sales manager of Briggs & Stratton, a manufacturing firm in the automobile industry.

Mr. Rasch also announced the appointment of Harold Massey, formerly sales engineer in the home office, to the position of assistant general sales manager. Mr. Massey entered the gas industry in 1923, following his graduation from Stevens Institute of Technology, as an employee in the manufacturing department of the William M. Crane Co. Later, when that company became the Standard Gas Equipment Corp. he entered the designing and engineering department. He entered the employ of American Radiator Co. in 1930 as a designer of gas appliances and was later transferred to the American Gas Products Corp. as sales engineer, when that company became a part of the American Radiator & Standard Sanitary Corp.

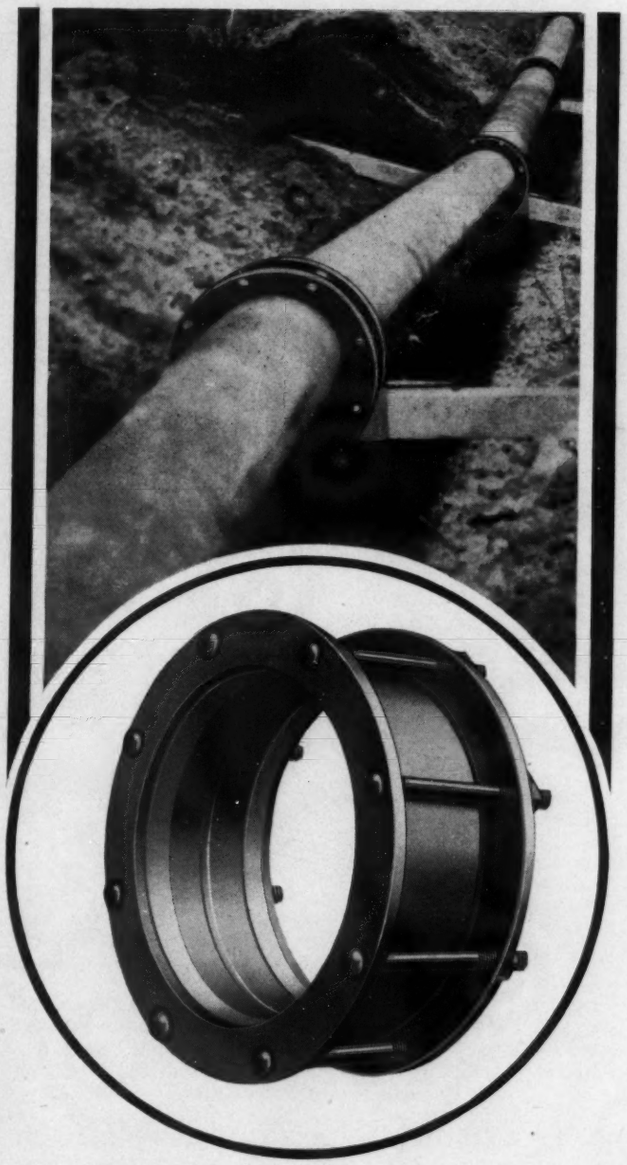
Hurlburt Appointed P. G. and E. General Display Representative

Chad Hurlburt has been selected as general display representative for the Pacific Gas and Electric Co., San Francisco, to succeed the late Frank Bevan.

Mr. Hurlburt has been in display and advertising work for many years, and is particularly experienced in window, floor, and special displays. In this capacity he has been connected with two of San Francisco's largest department stores, the City of Paris and the Emporium, for the past eight years.

Western United Corp. Dissolved

At a special meeting of stockholders on December 23 of Western United Corp., holding company of Aurora, Ill., it was decided to dissolve the corporation and liquidate its assets. A plan has been approved whereby each two shares of Western United Corp. preferred stock will be replaced by one share of stock in Western United Gas and Electric Co., which is an operating company.



The statement that "Dayton Couplings are strong, flexible and absolutely leak-proof" has been proven by years of uninterrupted service in thousands of installations.

The Dayton-coupled line is the economical line—both in original cost and maintenance expense.

Sizes and styles for every pipe line need.

THE NATIONAL-SUPERIOR CO.
DAYTON PIPE COUPLING DIV.
DAYTON, OHIO

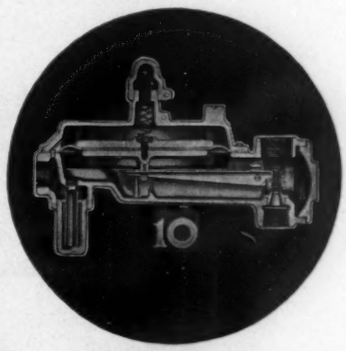
from the Records !

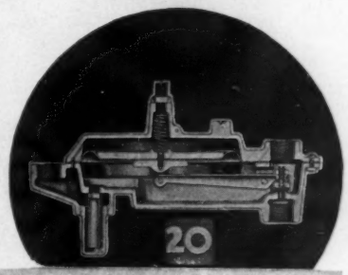
Over a period of years—ten, twenty, forty, or more years under all kinds of conditions, a real survey gives the facts on Regulator performance. Reynolds Engineering Department has investigated one after another of their installations that have been in use for periods extending up to forty years. In all cases the check-up has reflected credit on the Reynolds Engineering Department and in every case a satisfied user was of even greater importance to Reynolds.

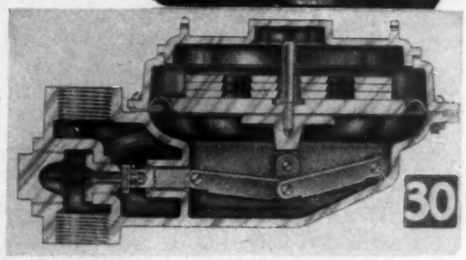
This check-up by Reynolds verified the dependability of their units with actual facts from the field and gave additional verification of shop tests, proving the superiority of Reynolds Regulators.

- Model 10—all parts accessible and interchangeable while in pipe line.
- Model 20—working parts so accurate as to permit complete interchangeability in shop.
- Model 30—has removable valve and orifice, and is made in either horizontal or vertical connections.

All three models manufactured in either spring or dead weight adjustment and with or without mercury seal.







Reynolds Branch Offices:

421 Dwight Building
Kansas City, Missouri

2nd Unit, Santa Fe Building
Dallas, Texas

Representatives:

Eastern Appliance Co.,
Boston, Massachusetts

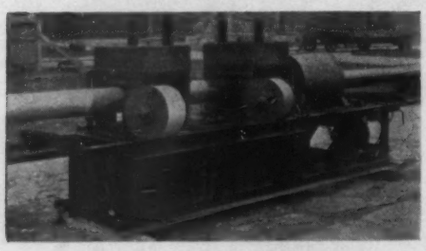
F. E. Newberry
Avon, New Jersey

REYNOLDS GAS REGULATOR CO.
ANDERSON, INDIANA, U. S. A.

GAS CONTROL SINCE 1892

REDUCE
Operating Cost
— WITH —
SPRAGUE METERS
— AND —
SPRAGUE REGULATORS

SPRAGUE METER COMPANY
Bridgeport, Conn.
Los Angeles-San Francisco, Cal.



LOWER MAINTENANCE COSTS

Protect service lines most economically in a positive manner by treatment on your own property. Pipe thus treated can be stored indefinitely. The machine illustrated handles pipe from 3/4 in. to 6 in. diameter. NO-OX-ID may be applied to main lines by traveling type of machine or by hand method.

Avail yourself of the savings NO-OX-ID can make for you on gas holders, tanks, pipe lines, service lines, and accessory equipment.

DEARBORN CHEMICAL COMPANY
Los Angeles: 807 Mateo Street, Phone TRinity 3385
San Francisco: 421 Bryant St., Phone SUtter 8688

NO-OX-ID
IRON-RUST
TRADE MARK
The Original Rust Preventive

Merco Nordstrom Valve Sales Staff Oakland Session

VARIOUS members of the Merco Nordstrom Valve Co.'s sales divisions from different parts of the country recently concluded a tour of the California Oil fields and a sales conference extending for several days at the firm's manufacturing plant in Oakland, Calif. In the group view above, taken during the conference, appear the following:

Bottom Row, left to right—S. T. Pollak Manufacturing Standards Department, Oakland, Calif.; M. H. Weston, Sales Department, New York, N. Y.; P. S. Williams, Plant Manager, Oakland, Calif.; James Baker, Sales Department, Houston, Texas; F. K. Spurrier, Research, Oakland, Calif.; E. E. Matheson, District Manager, San Francisco, Calif.; A. J. Kerr, Tulsa, Okla., Manager, Mid-Continent Area.

Center Row, left to right—R. F. Cleary, Manufacturing Cost Department, Oakland, Calif.; F. H. Ricker, Production Manager, Oakland, Calif.; L. A. Dixon, Vice-President, Pittsburgh, Penn.

Top Row, left to right—G. F. Scherer, Director of Research, Oakland, Calif.; J. L. Walden, Production Department, Oakland, Calif.; E. E. Hedene, Chief Engineer, Oakland, Calif.; Walter H. Davis, Vice-President, Oakland, Calif.; Colonel W. F. Rockwell, President, Pittsburgh, Penn.; S. J. Nordstrom, Consulting Engineer, Oakland, Calif.; W. J. Menefee, Purchasing Department, Oakland, Calif.; Russ Waters, Sales Department, Bakersfield, Calif.; C. H. Wyman, Sales Department, Chicago, Ill.; H. Boezinger, District Manager of Los Angeles, Calif.

Banquet Meeting of Northern California Appliance Men

FOR the double purpose of welcoming James B. Black, newly elected president of the Pacific Gas and Electric Co., San Francisco, and complimenting Louis F. Breuner, past president of the Retail Furniture Dealers Association of California, 90 appliance and furniture dealers of northern California met at a banquet at the Bohemian Club in San Francisco on January 15. Frank J. Runyan, acting as temporary chairman, pointed out in his remarks that the degree of cooperation that the P. G. and E. affords the dealers in its territory is unique. He stressed the value of P. G. and E.'s support of cooperative advertising, its financial support through the appliance societies and its routing of appliance sales through dealer channels.

A. B. C. Dohrmann, honorary chairman, in introducing Mr. Black, also voiced the dealers' appreciation of the company's cooperative policy. Mr. Black gave the history of P. G. and E.'s dealer cooperation, saying that it was first ennunciated by John A. Britton as far back as 1904. In 1924 it was reaffirmed by Wiggington E. Creed, then president of P. G. and E., and again reaffirmed in 1927 by the late A. F. Hockenbeamer. Mr. Black closed his address with a pledge that the company will continue the policy.

"You, Utilities and the Government" by Ernest Greenwood

Ernest Greenwood, author of "Spenders All," has recently written another book entitled "You, Utilities and the Government," published by the D. Appleton-Century Co., New York. The book is an analysis in layman's language on the government's stand with respect to the business world. The author points out that the recent legislation attacking utilities is only the beginning, a first thrust of a wedge, in a general program to wrest big business from the forces and individuals that have created it in a world of freedom and enterprise.

"You, Utilities and the Government" devotes considerable attention to the trend of the present administration, and discusses the far-reaching consequences of the utility holding company act.

Why Should a Utility Sell?

(Continued from Page 13)

Following the company's withdrawal from sale of the smaller heaters in the middle of 1932 the curve of dealer sales effort ran about as follows:

1. In the summer of 1932 the dealers staged the agreed-upon special campaign and did a very creditable job of advertising and selling.
2. In 1933 they took no part in the summer campaign.
3. In 1934 the dealers raised objections to any special offers in summer selling.
4. By 1935 the circulator market was practically forgotten.

The P. G. and E. had by no means lost interest in this market. A close study of sales results was maintained, and the company was aware that volume of business was steadily decreasing. It knew, too, that the newly introduced oil-fired circulators were making inroads into what should have been gas sales.

By 1935, then, even though the manufacturers had begun to produce the larger size heaters (to which the company was confining its direct sales), at lower prices scaling gradually upward from the small heater prices, the circulator business in P. G. and E. territory was nearly at a standstill. The cream of easy sales had been skimmed off the market, and dealers were exerting no effort to maintain sales volume. The larger share of the market was untouched, but it lay in the lower income brackets, among families using wood or coal for heating. This market, the company recognized, has to be sold by personal solicitation.

There was an evident need for a continuous, aggressive campaign leveled at this lower income market through personal solicitation and general promotion—a type of activity the dealers could not be expected to maintain. Manufacturers of circulators had seen their production drop off, and began to urge for renewal of gas company direct selling. By fall of 1935 the company had determined to reenter the market and was convinced that the dealers could be made to recognize that their own best interests would be served by this course.

The story was laid before directors of the Gas Appliance Society of California—representing all major dealers—at a meeting held October 2. General Sales Manager Crawford first traced the decline in sales since the company's withdrawal. Total sales of circulators for the last 4-year period by dealers and company combined, were shown as follows, in round figures: 1931—12 thousand; 1932—13½ thousand (P. G. and E. continued selling up to middle of year); 1933—11 thousand; 1934—8 thousand.

Local manufacturers of circulators added their testimony, showing that in some cases their sales had dropped to less than 25 per cent of the 1932 volume.

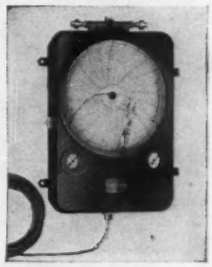
Dealer Sales Promotion Manager Reynolds next offered an exhibit of dealer advertising on circulators, showing how poorly the volume of such advertising compared with the volume of dealer gas range advertising (see illustrations, Page 13). It was demonstrated that virtually no advertising was being done during the summer on this appliance, and that the total volume of circulator advertising by dealers was negligible in contrast to that carried during the earlier years of active sales work when the P. G. and E. also was selling.

For some time the Gas Appliance Society has kept a record of advertising carried on by dealers for various appliances. A group of seven metropolitan papers in the Bay District is checked daily, and another group of six key interior city papers, giving an accurate gauge of the advertising trend. One of the accompanying graphs shows the 1935 advertising record on circulators. It is seen that practically no advertising of consequence was done up to October, when the P. G. and E. resumed its direct selling and reawakened dealer interest in the circulator market.

Mr. Crawford gave the company's decision to reenter the market and asked for the Society's endorsement of this action on the basis of the facts demonstrated. Unanimous action of the directors gave this endorsement.

From the P. G. and E. experience the conclusion stands out that sustained sales leadership is essential to maintain a market, particularly one which lies in the lower brackets of purchasing power. No appliance is so essential, in this competitive day, that it will

PRECISION
Temperature Control
....as you like it and as you need it



Full Floating Free Vane Air Operated Temperature Recorder Controller, Model 5240M. Class 2 vapor filled system.

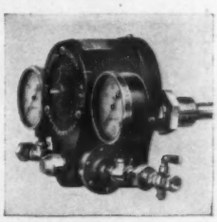
NO two control problems are alike. Consequently no one controller can be expected to serve best under all conditions.

Because of certain reasons which you can't overlook, or because of individual experiences and preferences, you may prefer one type of automatic temperature control. Other process conditions may require other types.

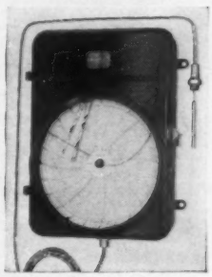
For this reason Bristol provides a complete line of equipment, so diversified in design, type, method of operation and applicability, that several solutions of a given problem often are available. This permits a selection assuring the highest efficiency.

Since in addition Bristol makes a complete line of automatic valves, Bristol is in the favorable position of being able to develop the complete control system as a balanced, correctly co-ordinated unit, and to assume undivided responsibility for its satisfactory performance.

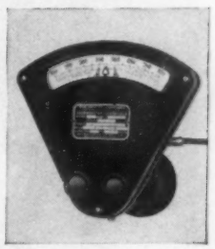
Feel free to consult us.



Single pen thermometer. Wall type. Air Operated Temperature Controller, Expansion Stem System, Direct Acting, Series 250.



Direct-Set Mercury-Contact Electric Operated Temperature Recorder Controller, Model G 240L. For wall mounting.



Electric Operated Temperature Indicating Controller, Model 377B. With single or double adjustment contacts.

THE BRISTOL COMPANY

Branch Offices: Rialto Bldg., San Francisco . . 747 Warehouse St., Los Angeles . . Branch Factory: 311 Minna St., San Francisco

BRISTOL'S

TRADE MARK REG. U. S. PAT. OFF.

PIONEERS IN PROCESS CONTROL SINCE 1889

FEBRUARY
MARCH
APRIL

good months for

Floor Furnace SALES

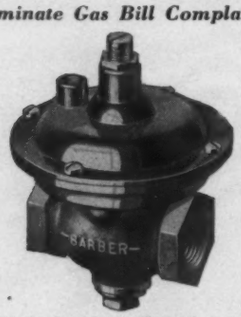
Weather Bureau Statistics show that many cold, damp days of winter are still ahead. Good months to build your load by selling the best floor furnace money can buy. Sell WARDS, the furnace that once installed stays in for years. It is the only floor furnace that has the three features that make "Controlled Winter Comfort" possible . . . Bilt-in Thermo-Control, Cradle Circulation, Automatic Pilot. Remember . . . your load is as good as the appliance you sell.

For Facts about how you can increase your load with WARDS, write . . . .

WARD HEATER CO.
1800 W. WASHINGTON
LOS ANGELES, CALIF.

BARBER
Gas Pressure
REGULATORS

Eliminate Gas Bill Complaints



Made in ¼", ⅜", ½", ¾" 1", 1¼", 1½" and 2" sizes.

INCREASING numbers of Gas Appliance Manufacturers, Gas Companies, Jobbers and Dealers have switched to Barber Regulators because of their exceedingly low pressure drop, compactness, bronze bodies, and precision of operation. Why not write today for complete literature, prices and discounts on the entire Barber line of Burners and Regulators?

The Barber Gas Burner Co.
3702-4 Superior Avenue
CLEVELAND - - - - - - - - OHIO

carry itself. There is always a substitute to which the buyer will turn when proper sales effort is placed behind it—as was the case with oil-fired circulators in Northern California.

Another conclusion from this Northern California example is that it pays a utility to have exact information on market trends in its service area. If the company had not had full facts on declining sales, and declining advertising volume, it would have been difficult to convince dealers of the need for direct selling, and the company's reentry into the market might have been achieved at the cost of harmonious relations with its dealers. As it was, the endorsement given the company's renewed selling on sizes of this appliance showed that the facts registered with the dealers. Furthermore, an improvement in sales results for everyone in the market proved the wisdom of the company's action. Circulator sales up to October of 1935 (when P. G. and E. selling started again) were about 4½ thousand, with an equal number sold in the remaining three months of the year. Even allowing for the effect of fall weather the influence of the company's direct selling is apparent, and the bulk of the actual sales came through dealer channels.

Division Chairmen Named for "Clean Up Campaign"

THE national gas water heater "Clean Up Campaign," which is being sponsored jointly by the Water Heater Committee of the A. G. A. and the Gas Water Heater Division of the Association of Gas Appliance and Equipment Manufacturers, is under the direction of the following chairmen according to geographic divisions:

Division 1—Cyrus Barnes, Boston, Mass.: Massachusetts, New Hampshire, Maine, Rhode Island, Vermont, Connecticut.
Division 2—R. E. Williams, Binghamton, N. Y.: New York, New Jersey, Ohio.
Division 3—H. S. Christman, Philadelphia, Pa.: Pennsylvania, Delaware.
Division 4—Chas. W. Merriam, Jr., Roanoke, Va.: Maryland, Virginia, District of Columbia, West Virginia.
Division 5—J. W. Lea, Atlanta, Ga.: Georgia, Florida, South Carolina, North Carolina.
Division 6—Wm. E. Leverette, Nashville, Tenn.: Tennessee, Mississippi, Kentucky, Alabama.
Division 7—C. A. Luther, Chicago, Ill.: Illinois, Wisconsin, Michigan, Indiana.
Division 8—A. L. McKinstry, Cedar Rapids, Iowa: Iowa, Minnesota, North Dakota, South Dakota, Nebraska, Missouri.
Division 9—G. B. Buck, Denver, Colo.: Colorado, Utah, New Mexico, Kansas, Wyoming.
Division 10—James F. Pollard, Seattle, Wash.: Washington, Oregon, Idaho, Montana.
Division 11—H. E. Davidson, Los Angeles, Cal.: California, Nevada, Arizona.
Division 12—W. A. McIntyre, Port Arthur, Texas: Texas, Oklahoma, Louisiana, Arkansas.

R. A. Koehler, of Public Service Electric & Gas Co., Newark, N. J., is general chairman of the campaign. The executive committee of the Gas Water Heater Division of the A. G. A. E. M. is comprised of R. J. Canniff, chairman, A. P. Brill, Arthur Friedman and C. W. Berghorn, A.G.A.E.M. executive secretary.

Robertshaw Thermostat 1935 Sales Show 70.7 Per Cent Increase

AN indication of the improvement in the gas appliance business generally is shown by the reported increase of 70.7 per cent in unit sales for 1935 by the Robertshaw Thermostat Co., Youngwood, Pa. The company reports the largest unit sales in its history. For most of the year 1935 the Robertshaw plant ran three shifts to take care of the increased demand for heat controls. Plant facilities were enlarged by the completion of a new addition providing 10,000 sq. ft. of space.

The Robertshaw plant produces a complete line of thermostats for domestic ranges, coffee urns, steamtables, heavy duty ranges, rinse tanks, ovens and deep-fat fryers for hotel and restaurant kitchens, a wide line of industrial thermostats for manufacturing processes and a line of automotive thermostats for controlling the temperature of motors and car heaters.

For fifteen years the company has employed national advertising to sell the advantages of heat control cookery to millions of gas consumers. Among its recent promotional activities is the "direct-to-the-tenant apartment house program" conducted last fall. While Robertshaw's 1936 plans have not been announced in detail, the management reports that they contemplate a program closely coordinated with the National Gas Range Contest and a more intensive effort than ever before to sell the benefits of measured heat to gas users.

Oil Operators Urged to Curtail Gas Production in California

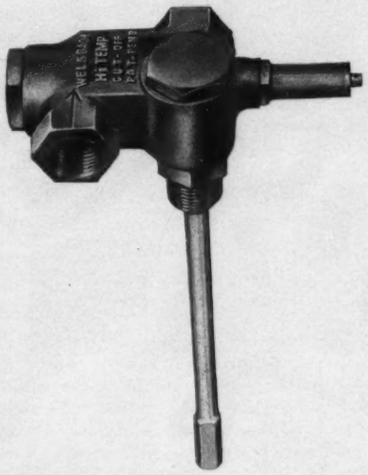
WITH production of oil on the increase in California since last July, and consequent higher volume of gas produced, gas companies are becoming concerned at the prospect of some wastage developing when loads drop off with spring weather. Thus far, due to favorable market conditions, it has been possible to take care of the increased gas volume, except for possibly 15 million feet daily lost in the Mountain View field, a comparatively new area.

Having this problem in mind, A. B. Macbeth, president of the Southern California Gas Co., last month communicated with the Central Committee of California oil operators, urging that gas conservation be given due thought in shaping the oil curtailment program on which the Committee is concentrating its efforts.

Increased drilling at the Mountain View and North Belridge field in the San Joaquin Valley, and in Playa del Rey, East Montebello, Long Beach and Huntington Beach fields of the Los Angeles basin, has accounted for most of the increase in available gas.

Welsbach Announces Water Heater Hi-Temperature Cut-off

THE Welsbach Co., Gloucester City, N. J., announces the development of the Welsbach Hi-Temperature Cut-off valve for water heaters. When the water temperature reaches a predetermined point, the cut-off valve automatically shuts off the gas



supply to the water heater burner. A unique feature of the Welsbach Hi-Temperature Cut-off valve, is that when the water has cooled sufficiently, the gas supply can be re-established simply by pressing a button.

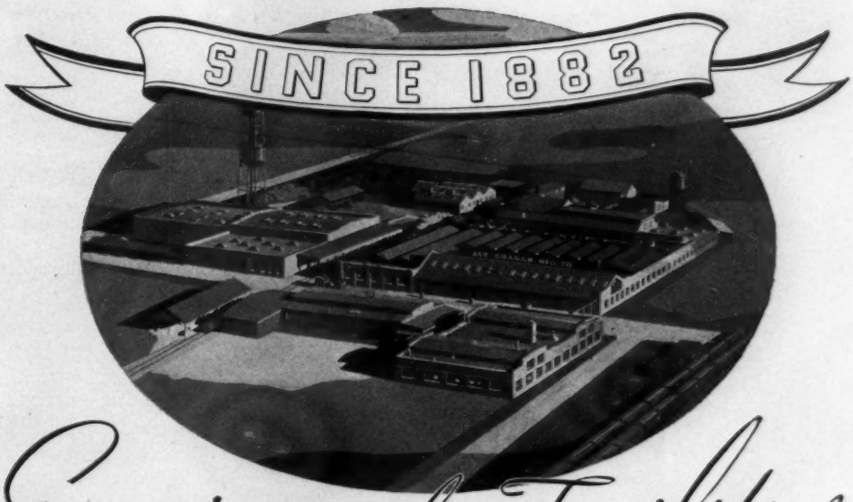
Meeting on Gas Hair Dryer Requirements in Los Angeles

Several members of the American Gas Association Committee on Gas Hair Dryer Requirements met in Los Angeles on January 28. Recommendations in connection with the requirements now being formulated on this appliance were forwarded to Cleveland where a general meeting of the committee was called for January 31.

Present at the Los Angeles meeting were W. M. Berry, consulting engineer; A. J. Hartfield, Pacific Gas Radiator Co.; Hugo Johnson, Los Angeles Gas and Electric Corp., and Harry E. Kerr, president of the Barber Gas Burner Co. of Cleveland, Ohio, who is on the west coast on a brief business trip. The meeting was held at the A. G. A.'s Pacific Coast Branch Laboratory, with Dr. F. E. Vandaveer, director of the branch laboratory, acting as secretary.

Policyholders Service Bureau Publishes Report on Supervisor Training

The Policyholders Service Bureau of the Metropolitan Life Insurance Co. has recently published a report of a survey of the practices of 85 companies on the subject of "Training Supervisors and Key Men." The report deals with the various methods employed by the companies in training their supervisors and foremen, and discusses methods of planning a training program, covering costs and other details. Copies of the report are available from the Policyholders Service Bureau, Metropolitan Life Insurance Co., One Madison Ave., New York City.

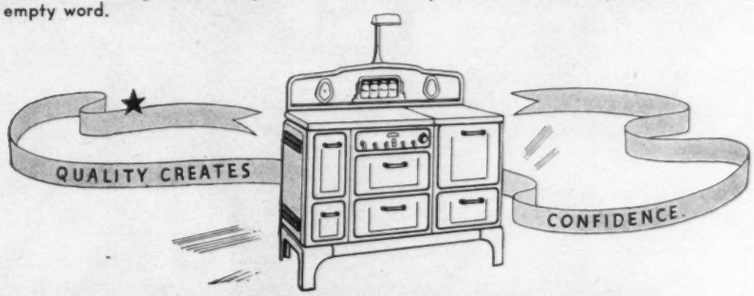


Experience plus Facilities

PRODUCE LEADERSHIP

Leadership is a privilege that cannot simply be claimed — it must be earned. Wedgewood's leadership is evidenced in the size and excellence of its manufacturing facilities and in its 54 years of stove building experience.

The products of a company must have quality if buyer confidence and sales are to follow. The fact that the Wedgewood factory is the largest of its kind in the West indicates that Wedgewood has grown into Leadership and has not merely claimed an empty word.



JAMES GRAHAM MANUFACTURING CO.
San Francisco, Newark, Los Angeles and Portland, Oregon

WEDGEWOOD
... The MODERN GAS RANGE

PORCELAIN ENAMEL INSTITUTE, INC.
612 NORTH MICHIGAN AVENUE • CHICAGO

Please send me, absolutely free, a copy of your new, easy-reading, profusely illustrated sales manual on Porcelain Enamel.

Name_____

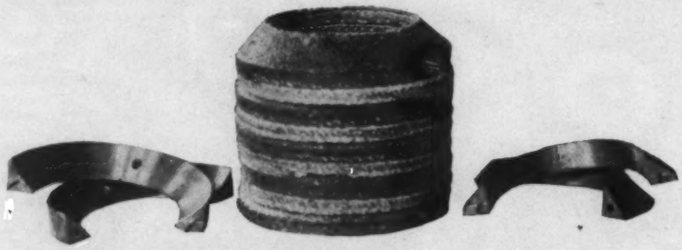
Firm_____

Address_____

H. R. Basford Co. Representatives Visit Ruud Factory

IN January a group of 10 salesmen and executives of the H. R. Basford Co., San Francisco, California distributor for the Ruud Manufacturing Co. of Pittsburgh, Pa., visited the Ruud factory at Pittsburgh. Last month marked the thirteenth anniversary of H. R. Basford Co. as California distributor for Ruud.

The group shown above at the Pittsburgh plant are left to right, R. H. Lewis (Ruud), E. J. Horton (Ruud), G. P. Egleston (Basford), Don Mitchell (Basford), A. P. Brill (Ruud), V. P. Willian (Basford), George A. Willard (Basford), A. F. Rice (Basford), Frank L. Pollard (Basford), M. A. Murphy (Basford), R. B. Lees (Basford), Carl A. Noble (Basford), Paul D. Lago (Basford) and M. M. Scott (Ruud).



Accordion Packing for Hot Oils and Tars Containing Sulphur, Acids or Alkalies

Accordion Packing Rings are built in all sizes, and are designed for any make of pump at any pressure and for all operating temperatures up to 850° Fahr.

Propane, Butane, other light oils, and heavy oils and tars of any gravity may be effectively sealed.

For additional information write for Technical Bulletin No. 390.

THE TEXACONE COMPANY
INCORPORATED IN TEXAS
MANUFACTURERS OF
High Pressure Packing and Specialties

2007-9 W. Commerce DALLAS, TEXAS P. O. Box 4186
Pacific Coast Address: 923 E. Third St., Los Angeles, California
Eastern Address: 5427 Grand River Avenue, Detroit, Michigan

Northwestern Ohio Natural at Toledo Has Active Sales Program

NORTHWESTERN Ohio Natural Gas Co., at Toledo, has sold to date approximately 100 water heaters in a campaign launched December 31 and continuing through February 29.

A refrigerator campaign will be started March 1 to extend through March, April, May and June. Three refrigerator specialists will supervise the efforts of the company's 18 salesmen during the campaign.

The company has sold 50 unit heaters during the past three months. F. E. Myers is sales manager and I. A. Ludwig, manager of the company. Mr. Ludwig was recently transferred to the Toledo post from another property in the group.

A.P.I. Publishes Oil Industry Survey and Prospectus

THE American Petroleum Institute has recently published a book entitled "American Petroleum Industry," which is a survey of the present status of the industry and a prospectus of its future. The subject matter is covered under the general headings of Demand, Production and Supply, Transportation, Refining, Marketing, Taxation and Labor.

The 229-page volume is based upon a special survey made by the Institute in 1925, entitled "American Petroleum: Supply and Demand." This survey is now brought down to date and is broadened by addition of the chapters on transportation, refining, marketing, taxation and labor.

Slade Appointed Sales Manager Central Kentucky Natural

Theo. Slade, formerly manager of the Lexington (Ky.) Gas Appliance Co., has been appointed sales manager of the Central Kentucky Natural Gas Co. Mr. Slade first entered the gas industry in the service of the Kansas Gas and Electric Co. He was then successively with Wichita Gas Co., Kelvinator Corp., serving as director of sales in the utilities division, and then division manager for Kansas Power Co. at Great Bend, which post he held until his connection with Lexington Gas Appliance Co.

Detroit Preparing for Changeover to Natural Gas

As the result of the contract recently made between the Detroit City Gas Co. and the Panhandle Eastern Pipe Line Co. for a natural gas supply for Detroit, the Detroit company is making preliminary plans for the changeover. Detroit City Gas Co. engineers have visited Minneapolis, Davenport, New Orleans, Atlanta and Denver, studying the methods of changeover to natural gas used by the companies serving these cities.

While detailed plans for the operation are not as yet completed, it is expected to recruit a changeover crew of about 1,000 men.

High Heating Saturation at Jefferson

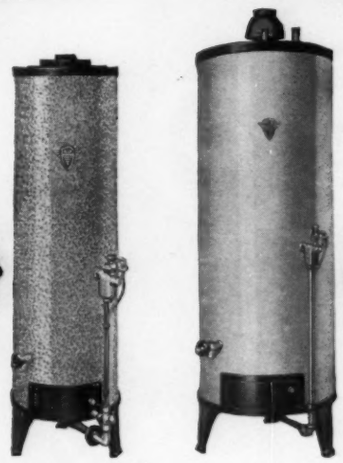
Jefferson, Iowa, on the lines of the Iowa Electric Light and Power Co., has the highest percentage of gas heated homes of any town in the state. Last year 80 new gas house heating installations were made.

AMMUNITION
FOR PRIZE WINNERS
IN THE AUTOMATIC GAS WATER HEATER
PRIZE CONTEST

sponsored by the Ass'n of Gas Appliance and Equipment Manufacturers*

AGP REGULAR
automatic gas-fired, storage
WATER HEATER

Multiple flue type, completely automatic. Baked enamel steel jacket, tank of galvanized heavy gauge steel or strengthened copper. 5 sizes, 20 to 75 gal.



THE DICTATOR
automatic gas-fired, storage
WATER HEATER

Single flue type, completely automatic. Baked enamel steel jacket, tank of galvanized heavy gauge steel or strengthened copper. 4 sizes, 15 to 40 gal.

*Have you heard the big news? Thousands of dollars in prizes every month to you and your salesmen for selling gas water heaters. The biggest promotion event of its kind. Write for details today if you have not already received them.

Be right up in front when the band starts playing and the prizes are being awarded in the big Prize Contest. Concentrate on AGP gas-fired Water Heaters — and you'll pass your quota easily. Feature them — and they'll practically sell themselves; for they have every feature and every advantage that makes people want automatic hot water with gas.

What's more, they'll *stay* sold. Dependability is built into them. The name on the emblem that each of them carries is a guarantee of honest workmanship that will back up your own good reputation. Get the business that's coming your way. Find out about these business-building, sales producing automatic gas-fired water heaters. Write today for the complete details.

AMERICAN GAS PRODUCTS CORPORATION
DIVISION OF AMERICAN RADIATOR COMPANY
40 WEST 40TH STREET · NEW YORK, N.Y.

AGP gas-fired WATER HEATERS

Rigid tests conducted in the laboratory of the American Gas Association prove that mechanical joints as made by members of The Cast Iron Pipe Research Association are bottle-tight under all working pressures. All are based on the stuffing box principle.

History has proved the material—we have improved the joint. What a combination of efficiency and long life! Here, for example, is a cast iron gas main that has been in service in Baltimore for more than 100 years.

CAST IRON PIPE

THE STANDARD MATERIAL FOR DISTRIBUTION MAINS

The Cast Iron Pipe Research Ass'n, Thos. F. Wolfe, Research Engineer, 1015 Peoples Gas Bldg., Chicago